CENTRONICS

CENTRONICS

CENTRONICS

CENTRONICS

CENTRONICS

CENTRONICS

CENTRONICS

CENTRONICS

MODEL 739 SERIES

PRINTERS

37400911 REV B JUNE 1981

OPERATORS MANUAL

TP 7-80

THE INFORMATION CONTAINED HEREIN IS PROPRIETARY AND IS NOT TO BE RELEASED OR REPRODUCED WITHOUT WRITTEN PERMISSION OF CENTRONICS DATA COMPUTER CORP.

SERVICING INFORMATION FOR YOUR PRINTER MAY BE OBTAINED BY CALLING THE NUMBERS LISTED BELOW. (ASK FOR FIELD ENGINEERING)

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051
Tel. (603) 883-0111, TWX. (710) 228-6565, TLX. 94-3404
Field Engineering Headquarters (603) 883-2492

Regional Sales Offices
Eastern Region (Mass.): Tel. (617) 935-6150, TWX. 710-348-0343
Central Region (Texas): Tel. (617) 461-5711, TWX. 910-890-4916
Western Region (Calif.): Tel. (714) 979-6650, TWX. 910-595-1925

Regional Field Engineering Offices
Eastern Region (Mass.): Tel. (617) 935-8130
Central Region (Texas): Tel. (617) 461-7121
Western Region (Calif.): Tel. (714) 957-1510

Centronics Data Computer (Canada) Ltd.
Mississauga, Ontario
Tel. (416) 625-0770, TWX. 610-492-4382

Centronics Data Computer (U.K.) Ltd.
London, England
Tel. 011-44-1-581-1011, TLX. 851-877801

Centronics Data Computer (France)
71-73 Rue Desnouettes, 75015 Paris, France
Tel. 828-4051, TLX. 202686

Centronics Data Computer (Germany), Gmbh
6000 Frankfurt am Main 71
Tel. 666-1021, TLX. 841-413224

Centronics of Puerto Rico
Dorado, Puerto Rico
Tel. (809) 796-1881, TLX. 385-9349

Centronics (Italia) S.P.A.
Via Santa Valeria 5, 201123 Milan, Italy
Tel. 809-514

© Copyright 1980 Centronics Data Computer Corp.
All rights reserved
Patents pending in U.S.A. and other countries
Printed in U.S.A.

Specifications subject to change without notice

4/81 Rev. D

MODEL 739 SERIES

PRINTERS

37400911 REV B JUNE 1981

OPERATORS MANUAL

TP 114 12-80 C

WARNING

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: ''How to Identify and Resolve Radio-TV Interference Problems.'' This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

JANUARY 1, 1981 APPROVED, CLASS B

NOTE: This FCC statement pertains to the 739-1 only.

TABLE OF CONTENTS

SECTION 1—GENERAL INFORMATION

PAGE

1.1 SCOPE OF THIS MANUAL 1-1
1.2 DESCRIPTION 1-1
1.3 SPECIFICATIONS 1-2
1.4 PRINCIPLES OF OPERATION 1-2
1.5 CHARACTER STYLES 1-3
1.6 GRAPHICS 1-5
1.7 OPTIONAL FEATURES 1-5
1.8 ACCESSORIES 1-5

SECTION 2—INSTALLATION

2.1 PRINTER INSPECTION 2-1
2.2 SET-UP PROCEDURES 2-1
2.3 PAPER INSTALLATION 2-2
2.4 RIBBON REPLACEMENT 2-3
2.5 COUNTRY SET SELECT; SELF TEST; AUTO LINE-FEED ENABLE 2-4

SECTION 3—INTERFACE INFORMATION

3.1 PRINTER INTERFACE 3-1
3.2 PRINTER INTERFACE CABLE 3-1
3.3 INTERFACE DRIVERS AND RECEIVERS 3-1
3.4 ASCII CODES; PROPORTIONAL WIDTHS 3-2
3.5 ASCII CROSS-REFERENCE 3-3
3.6 INPUT/OUTPUT SIGNALS 3-4
3.7 HOST-GENERATED CONTROL CODES 3-5
3.8 PROGRAMMING CONSIDERATIONS 3-6
3.9 JUSTIFICATION CODE SEQUENCES 3-7
3.10 GRAPHIC CODES 3-8

SECTION 4—OPERATION

4.1 CONTROLS AND INDICATORS 4-1
4.2 OPERATING PROCEDURES 4-1
4.3 OPERATING NOTES 4-2

SECTION 5—OPERATOR MAINTENANCE

5.1 PREVENTIVE MAINTENANCE 5-1
5.2 TROUBLESHOOTING 5-1
5.3 REMOVAL OF COVER ASSEMBLIES 5-2
5.4 FUSE (F3) REPLACEMENT 5-2
5.5 SELF-TEST PROCEDURE 5-3

ADDENDUM FOR EXTENDED BASE PRINTERS A-1

SECTION 1
GENERAL INFORMATION

1.1 SCOPE OF THIS MANUAL

This manual contains information for the installation, operation and operator-level maintenance of the 739-1 and 739-2 printers. Differences between the two models are noted whenever appropriate. Refer to paragraph 1.3 for detailed specifications.

1.2 DESCRIPTION

GENERAL—The Model 739 is an operationally simple, compact, dot-matrix printer that prints monospaced and proportional characters in line lengths up to 8 inches. Pin-addressable graphics of six vertical dot positions per character are available through host control. Printing is performed in the forward direction at a speed of 10 inches per second. The high-density dot pattern and true descenders produce high-quality characters. Complete sets of character styles are included in this section.

The monospace pattern is a 7×8 dot matrix, while proportional characters are formed by up to 9 vertical and 6-18 horizontal dots. Monospaced and proportional character sets consist of 96 ASCII characters each. Monospaced characters may be printed 10 characters per inch (cpi) or 16.7 cpi, providing 80 column or 132 column format for business applications. Proportional characters may be right justified under host control. Control codes are contained in Section 3.

COUNTRY SELECT—The Model 739 features character sets for six countries: The United States of America, France, United Kingdom, Germany, Italy and Sweden/Finland. The character set is selected by a switch pack setting. When power is turned on, the printer logic recognizes the switch settings and prepares to print characters for that country.

ELONGATED CHARACTERS—The 10 cpi, 16.7 cpi and proportional characters can be elongated beginning and ending anywhere within a line by host-generated control codes. Elongated characters are printed double-width, thus only half as many elongated characters can fit on a line.

PAPER HANDLING—The printer's three-way paper handling system accommodates the following types of paper:

1. 9½″ wide standard computer fanfold forms, using adjustable pinfeed pins (228.6 mm ±1 mm) to ensure paper registration. Paper can be single or multipart up to three parts.
2. Rolled paper, 8½″ wide, 1″ core and up to 5″ diameter. The printer includes a roll paper holder. With rolled paper, a built-in rip-and-read cutting edge allows removal of paper within 15 lines of the last line printed.
3. Single sheets of 8½ inch wide paper, hand fed as with an ordinary typewriter.

OTHER SIGNIFICANT FEATURES

- Automatic line feed enable; switchable.
- Host-controlled forward and reverse paper feed in full-line and half-line increments.
- Self test of ASCII characters.
- Underscore capability.
- Superscript and subscript capability.
- Host-controlled backspace capability.
- Top of form.
- Paper out switch.
- Quietized acoustic cover.

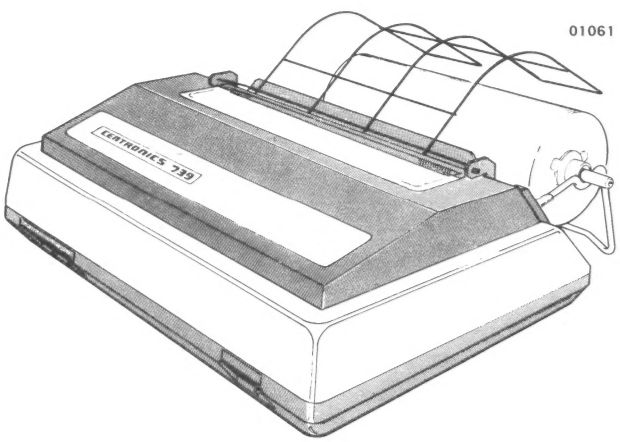


Figure 1-1 739 Printer with Roll Paper

1.3 SPECIFICATIONS

Printing Speed	100 characters/second (monospaced); 80 cps (proportional); 371 dots/second (graphics)
Characters Per Line	80 maximum (10 cpi); 132 maximum (16.7 cpi)
Print Width	8 inches (204 mm) maximum
Character Structure	7 × 8 Dot Matrix (Monospaced) N × 9 Dot Matrix (Proportionally Spaced)
Graphics	6 dots high, 594 dot positions per line (8 inches)
Line Feed Buffer	Capacity for 255 pending line feeds
Line Feed Repeat Rate	12 line feeds/second
Vertical Spacing	6 lines per inch (normal line feed)
Horizontal Spacing	Monospaced: 10 or 16.7 characters per inch (cpi) Proportional: 8.2 to 24.6 cpi depending on text; 13 to 14.5 cpi average density. Numerics are monospaced at 12.5 cpi for tabulation.
Parallel Data Input Connector	40-pin PC edge connector
Code Structure	Standard US ASCII; 7 bits, parallel
Input Data Rate	Up to 2,200 characters/second
Character Sets*	Primary: 96 US ASCII monospaced characters. Secondary: 96 US ASCII proportionally-spaced characters.
Input Voltage/Frequency	(739-1) 120 Vac +5%, −10%; 60 Hz ±1 Hz (739-2) 230 Vac +10%, −5%; 50 Hz ±1 Hz
Power Requirements	100 watts, maximum
Size	14-1/2″W × 11″D × 5″H; (368 mm) × (279 mm) × (127 mm)
Weight	12 lbs. (5.4 Kg)
Ribbon (12 per box)	15 Yard Zip-Pack mobius loop (Centronics Part No. 63701712-6001)
Paper Handling	Cut sheets, 8½″ (21.6 mm) wide Rolls 3½″ to 8½″ (88.9 to 21.6 mm)W × 5″ (127 mm) diameter; 1″ (25.4 mm) core; 3 ply maximum Fanfold 228 mm (9″) pin to pin; adjustable ±1 mm

* The 739 has switch-selectable country character sets for USA, France, United Kingdom, Germany, Italy and Sweden/Finland (Character Set A).

1.4 PRINCIPLES OF OPERATION

All logic, control, drive and power supply circuits are contained on one printed circuit board (Figure 1-2). The print mechanism rides on a carriage driven by a DC motor. The printing is performed in the forward direction only, printing up to nine dots per column. The paper feed (line feed) rollers are driven by a stepping motor which is capable of forward and reverse line feed; manual and computer-controlled. The ribbon drive (AC motor) moves ribbon past the print head at all times except when the carriage actuates the sensor at the leftmost carriage position. The power supply provides +5V regulated for the logic, +5V EXT for host device sense, +12V regulated for motor control, +17V unregulated for solenoid and motor drive, and 24 Vac for the ribbon motor. +17 V and −17 V are also provided for external use.

The host device transmits 7-bit parallel (ASCII) data and a strobe to the printer logic. The printer logic initiates and controls all transmissions from the host by the control signals ON-LINE, DEMAND, ACKNLG and BUSY. When the microprocessor has processed a complete line (or when a print command code is sent, the microprocessor directs the printer to print the characters, column by column. Print head actuation is performed by energizing solenoids that drive circular pins, forming dot matrix characters and underlines. The carriage moves forward at ten inches per second, with a speed of five inches per second for graphics.

1.5 CHARACTER STYLES

GENERAL—Three character styles; proportional, standard (10 cpi) and condensed (16.7 cpi) can be printed. The proportional characters are formed using an N × 9 character matrix. The standard and condensed characters are formed using a 7 × 8 character matrix. Any of the three character styles may be selected using host-generated control codes. When the printer is turned on the 10 cpi character style is automatically selected. Proportional characters and condensed (16.7 cpi) characters may be intermixed within lines of data. Standard (10 cpi) characters cannot be intermixed with condensed (16.7 cpi) or proportional characters within lines of data.

Any of the three character styles may be printed as elongated characters. Elongated characters are double-width characters formed by printing each column of dots within each character twice. Spaces between characters and words in this mode are also double width.

Figure 1-3 shows the character styles for the U.S.A., both normal and elongated. The variable characters that comprise European character set A are contained in Table 1-1. The following paragraphs describe each of the various styles and the control codes required for their selection.

STANDARD (10 CPI) MONOSPACED CHARACTERS

Standard (10 cpi) monospaced characters are initiated during power up or by using the ESC, DC3 control code sequence. Standard monospaced characters are 7 × 8 characters printed at 10 characters per inch (80 characters per line).

PROPORTIONAL CHARACTERS—Proportional characters are selected by using the ESC, DC1 control code sequence. The characters are N × 9 characters whose widths vary from 6 to 18 dot spaces. All numerals in this character style are the same width (12 dot spaces). This allows tabular numbers to be aligned vertically.

CONDENSED (16.7 CPI) MONOSPACED CHARACTERS—Condensed (16.7 cpi) monospaced characters are initiated using the ESC, DC4 control code sequence. Condensed monospaced characters are 7 × 8 characters printed at 16.7 characters per inch (132 characters per line).

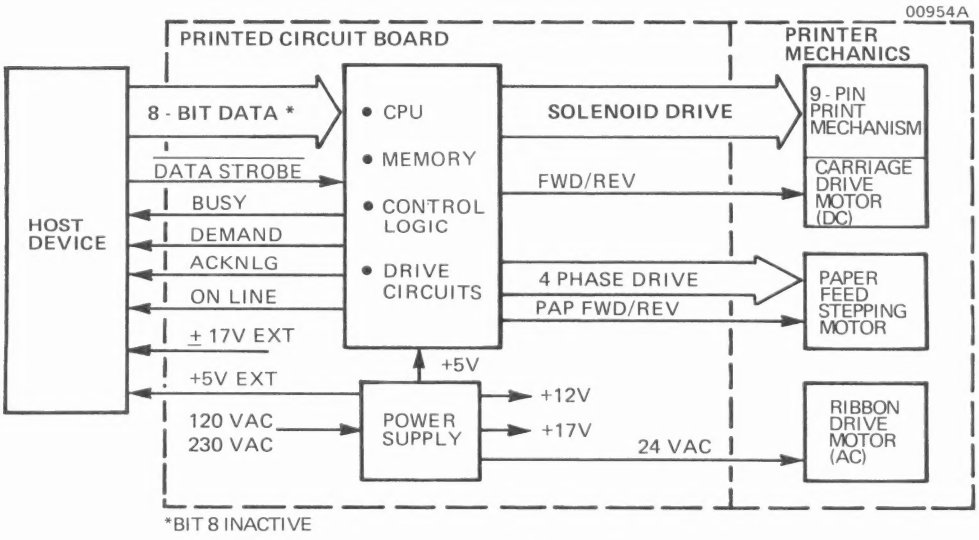


Figure 1-2 Basic Block Diagram

ELONGATED CHARACTERS—Elongated characters in all three character styles are initiated using the ESC, SO control code sequence and terminated using the ESC, SI control code sequence. Printing of elongated characters may be initiated and terminated within a line, which allows intermixing of normal and elongated characters within lines. Printing of elongated characters is automatically terminated at the end of a line. Carry-over of elongated characters to the next line must be accomplished by using the ESC, SO code sequence preceding the character data for the next line.

Figure 1-3 Character Styles (USA)

Table 1-1 Country Character Set "A"

00967-A

COUNTRY	043	044	100	133	134	135	136	140	173	174	175	176
U.S.A	#	$	@	[	\	]	^	`	{	|	}	~
FRANCE	£	$	à	°	ç	§	^	`	é	ù	è	¨
U.K.	£	$	@	[	\	]	^	`	{	|	}	~
GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ITALY	£	$	§	°	é	|	^	ù	à	ò	è	ì
SWED/FIN	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü

Note: Codes are in octal. See Figure 2-7 for switch settings.

1.6 GRAPHICS

The graphics function is entered by the sequence ESC%0 (27, 37, 48 decimal) and is terminated by any proper escape sequence, such as ESC DC1 (select proportional).

Graphics are formed by a six-pin vertical pattern, using one-half line spacing so that a solid graphic pattern is possible due to the dot overlap. After 594 bytes of graphic data are received by the printer, a one-half line feed and a carriage return are automatically generated. Printing speed for graphics is 5 inches per second. Dot density is 75 dots/inch horizontal and 72 dots/inch vertical.

GRAPHIC SAMPLES—Graphic samples are included below.

1.7 OPTIONAL FEATURES

CHARACTER SET "B"—A set of PROM's containing four character sets is available as an option. The countries are USA, Spain, Denmark/Norway and Portugal/Brazil.

CHARACTER SET "C"—Set "C" consists of character sets for USA and Greece.

1.8 ACCESSORIES

PRINTER MINI-EXERCISER (66003100-4001)—The mini-exerciser is a self-contained unit and includes an integral connector with two switches to control line length and different character formations. In combination the two switches produce four test sequences. An adapter cable (P/N 63669343-4001) is required to fit the edge connector on the 739.

TOOL KIT (63002399-6001)—A tool kit containing all the necessary tools (screwdrivers, nut drivers, pliers, etc.) to maintain the printer is available to the user.

01071

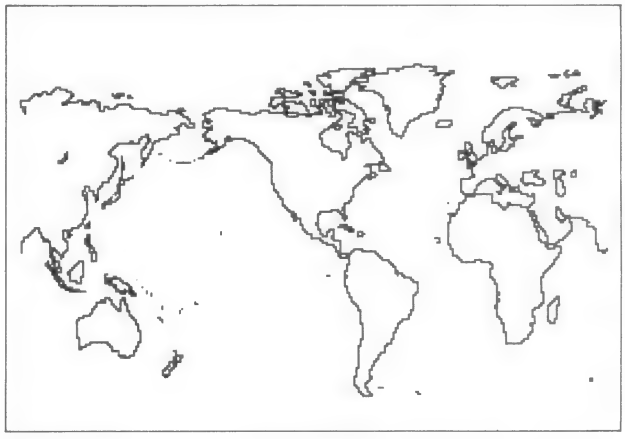


Figure 1-4 Graphic Samples

SECTION 2
INSTALLATION

2.1 PRINTER INSPECTION

Visually inspect the printer for signs of damage received during shipment. Immediately notify the common carrier of any discrepancies.

2.2 SET-UP PROCEDURES (Figure 2-1)

1. Remove the top cover, manually move the print head back and forth and check that the ribbon is feeding properly. Handle the print head carefully as shown in Figure 2-7.

2. Install one of three types of paper as described in paragraph 2.3.

3. Place POWER switch in the OFF position and place ONLINE/LOCAL switch in LOCAL position.

CAUTION

When turning power on or off, always place switch in LOCAL position to prevent erroneous communications and/or loss of data.

4. Check country character setting on DIP switch as shown in Figure 2-7.

CAUTION

Use care when setting DIP switches. Any damage to the printer caused while setting the switches (during the warranty period) may void the warranty.

5. Connect interface cable to printer and host device.

6. Connect the power cord to a 3-wire, grounded AC outlet.

7. Place POWER switch in ON position and ensure that LED illuminates through the paper exit slot.

8. Place ONLINE/LOCAL switch in ONLINE position to enable printer to receive data.

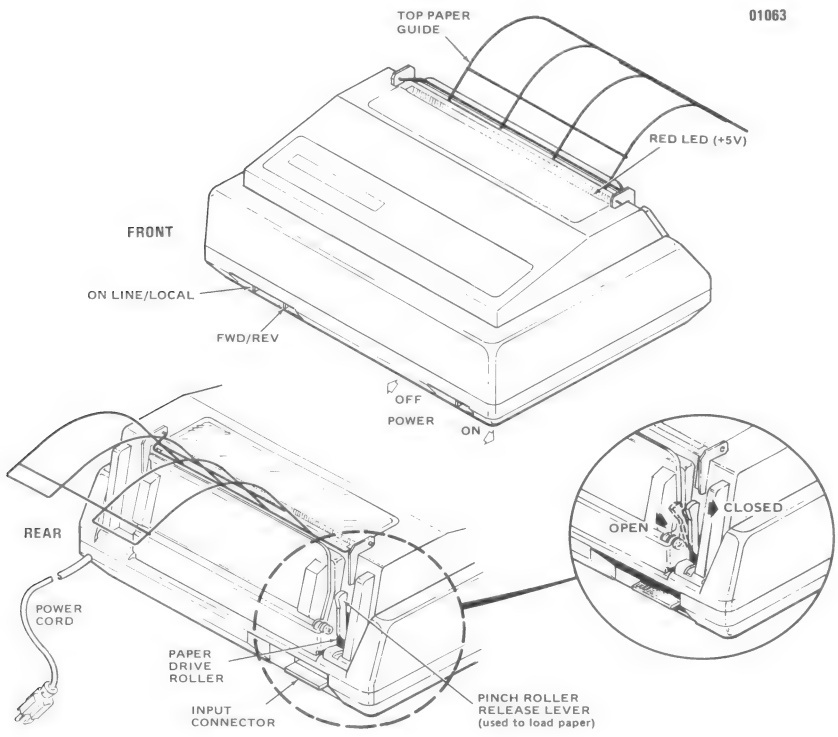


Figure 2-1 Set-Up Procedures

2.3 PAPER INSTALLATION

The printer can handle three types of paper; fanfold, roll and single sheet. Vertical line registration can vary depending on the type of paper used. To select the ideal type of paper for your application, consider the following guidelines.

PAPER APPLICATION GUIDELINES

1. Fanfold Paper: Precise line registration, 6 lines to the inch, can best be maintained using continuous fanfold edge perforated paper. Fanfold paper should be used whenever line registration is critical such as in preprinted form applications.

2. Roll Paper/Single Sheet: In pinch feed applications, when using roll paper or single sheet paper, the line spacing can vary depending on the finish and weight of the paper. Check the paper for your application before procurement or use of preprinted forms.

3. Single Sheet: The last line can be printed up to 1.6 inches (40.6mm) from the bottom of the page when using single sheet paper.

Refer to the appropriate procedure to install fanfold paper, roll paper or single sheets.

ROLL PAPER INSTALLATION

1. Set the printer on a flat surface with enough room in back of the printer for the roll paper holder.

2. Refer to Figure 2-2 and squeeze the roll paper holder support arms together slightly.

3. Insert support arms into two holes provided at rear of printer and release support arms.

4. Remove core hub from plain end and insert roller through standard 1-inch paper roll core and place roll on holder as shown with paper feeding from bottom of roll.

5. Remove top cover by lifting rear edge until latches are clear of main cover and then slide cover back to disengage front clips.

6. Retract head to the paper/ribbon load position by rotating head release lever fully counterclockwise. See Figure 2-5 for lever detail.

7. Push the pinch-roller release lever towards rear of printer. (Figure 2-1).

8. Feed the paper into the rear slot and under the paper drive roller.

9. Align the edges of the free end of paper with paper-drive roller edges and straighten as required.

10. Remove any skew between paper roll and the paper-drive roller by sliding the roll on the holder axle to align the paper as shown in Figure 2-3.

11. Push the pinch-roller release lever forward to secure paper.

12. Advance paper into printer by turning either thumbwheel until paper exits through the top of the printer.

13. Check ribbon position, remove slack if necessary, move head-release lever to print position, and install top cover. Print position numbers on print head assembly (Figure 2-5) indicate basic setting for number of plies of paper. Note that head-release lever setting (1, 2 or 3) may vary depending upon type of paper being used.

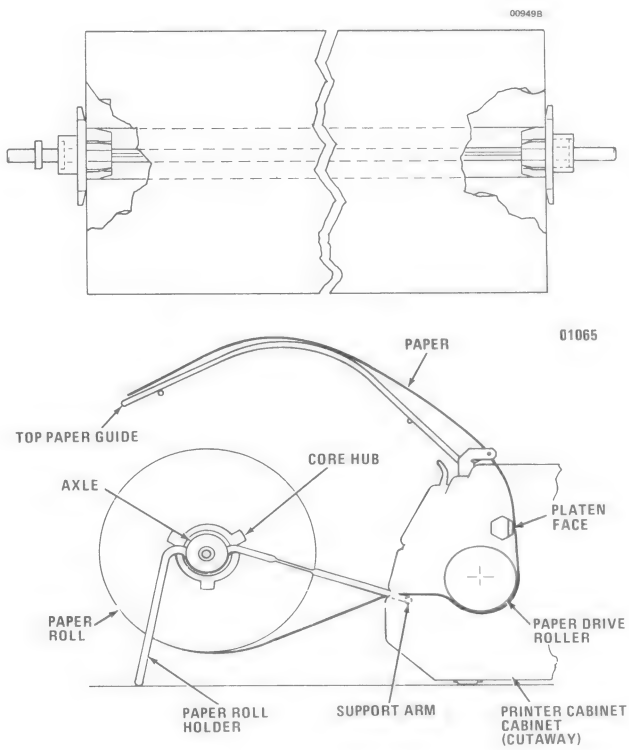


Figure 2-2 Roll Paper Holder Installation

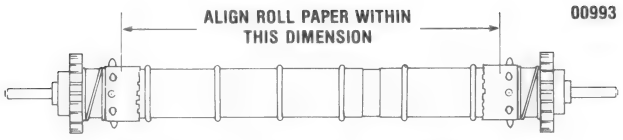


Figure 2-3 Paper Drive Roller

FANFOLD PAPER

1. Remove the top cover, retract head and ensure release lever is in rear (open) position.

2. Engage paper onto pins of paper drive roller at bottom rear of printer.

3. If paper holes do not line up with pins on paper drive roller, refer to Figure 2-4 and adjust per steps 4, 5 and 6. If lineup is satisfactory, go to step 7.

NOTE

The cam slot with the shaded area in Figure 2-4 is the "HOME" position (228.6 mm or 9" for the short version; 238.6 mm or 9.4" for the long version). The printer is shipped with the roller pins in the "HOME" position. While adjustment is being made, Index Pin MUST stay in Index Slot. Also, make certain that Cam Pin falls securely into Cam Slot.

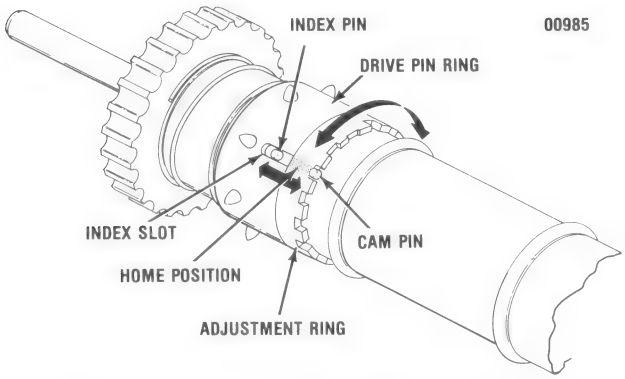


Figure 2-4 Paper Drive Roller Adjustment

4. Grasp drive pin ring and adjustment ring at one end of paper drive roller and slide towards end of roller.

5. With paper drive roller spring compressed, rotate adjustment ring to a deeper slot to reduce pin distance or to a shallower slot to increase pin distance.

6. Repeat steps 4 and 5 at other end of paper drive roller if necessary.

7. Hold paper in place while turning either thumbwheel until the paper exits through the top of the printer.

8. Ensure the paper supply is feeding properly.

9. Check ribbon position, remove slack if necessary; move head-release lever to appropriate print position and install top cover. Print position numbers on print head assembly indicate head release lever positions for number of plies of paper as a general rule. Note that the print-head position may vary depending upon type of paper being used.

NOTE

When using fanfold type paper, the pinch roll release lever should be left in the open position (away from printer).

SINGLE SHEETS

1. Push pinch-roller release lever towards rear of printer to the open position and open hinged paper chute for top loading.

2. Insert top edge of sheet into paper chute.

3. Slide sheet down the chute, under paper drive roller until sheet rises through paper-exit slot.

4. Match up top and bottom edges of paper. Straighten paper as required (normally, chute will guide paper properly without need to straighten).

5. Pull pinch-roller release lever forward to closed position and close paper chute.

6. Manually turn two thumbwheels until sheet is in position for the first printed line.

2.4 RIBBON REPLACEMENT

The printer uses a 180° mobius loop ribbon configuration that allows printing on upper and lower portions of the ribbon on alternate passes, thus increasing ribbon life. Ribbon replacement is as follows:

1. Remove top cover to gain access to ribbon tray. Refer to Figure 2-6.

2. Retract the print head by rotating head release lever fully counter-clockwise. See Figure 2-5 for lever detail.

3. Move the spring-loaded driven roller away from the driver roller and lift old ribbon out of the rollers. Refer to Figure 2-6 (top).

4. Unthread and discard old ribbon.

5. Remove Zip-Pack ribbon from plastic bag.

6. Place Zip-Pack ribbon in printer tray as illustrated in Figure 2-6.

7. Pull ribbon out from both ends of Zip-Pack and thread according to ribbon threading diagram, ensure mobius loop is positioned on left side of tray.

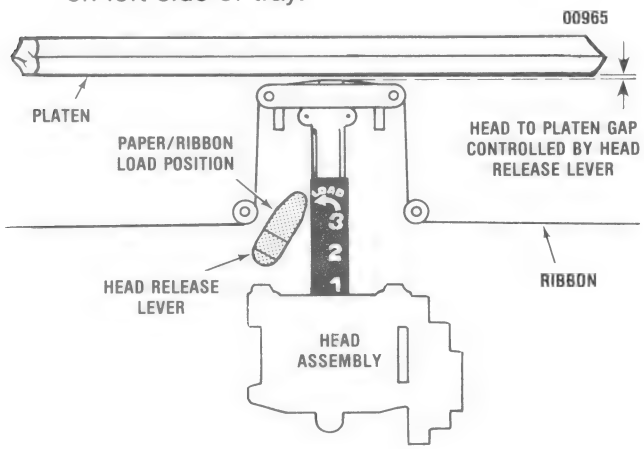


Figure 2-5 Head Release Lever Detail

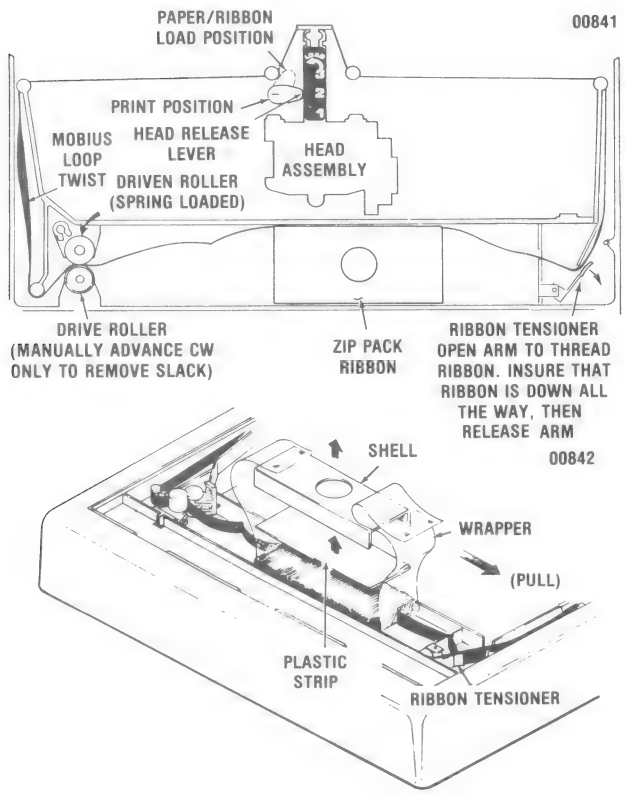


Figure 2-6 Ribbon Replacement

8. Hold ribbon in place by pressing down on plastic strip through hole in shell piece and then remove wrapper.

9. Remove and discard shell and plastic strip.

10. Manually advance drive roller clockwise until slack is removed from roller.

11. Reposition print head and install top cover.

2.5 COUNTRY SET SELECT; SELF TEST; AUTO LINE-FEED ENABLE

See CAUTION in paragraph 2.2. The 739 can print character sets for six countries: U.S.A., France, United Kingdom, Germany, Italy and Sweden/Finland. The character sets are selected by setting switch positions 1, 2 and 3 of DIP switch 1 on the logic PCB. To select a specific character set locate S5 in Figure 2-7, and set switch positions 1, 2 and 3 according to the table.

The self test switch positions are shown in Figure 2-7. See paragraph 5.5 for self-test instructions.

Automatic line feed after a CR (Carriage Return) is activated by S5, Switch 4 ON.

CAUTION

Use care when setting DIP switches. Any damage to the printer caused while setting the switches (during the warranty period) may void the warranty.

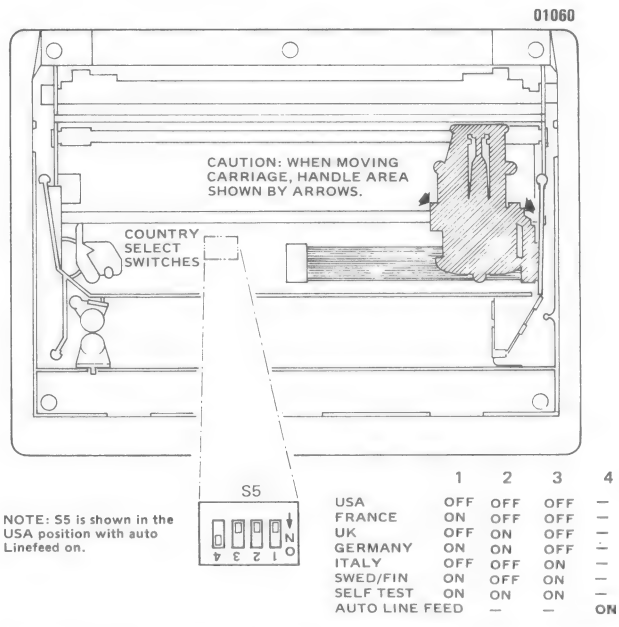

01060
CAUTION: WHEN MOVING CARRIAGE, HANDLE AREA SHOWN BY ARROWS.
COUNTRY SELECT SWITCHES
S5
NOTE: S5 is shown in the USA position with auto Linefeed on.
1 2 3 4
USA OFF OFF OFF —
FRANCE ON OFF OFF —
UK OFF ON OFF —
GERMANY ON ON OFF —
ITALY OFF OFF ON —
SWED/FIN ON OFF ON —
SELF TEST ON ON ON —
AUTO LINE FEED — — — ON

Figure 2-7 Country Set Select; Self Test; Auto Line-Feed Enable

SECTION 3
INTERFACE INFORMATION

3.1 PRINTER INTERFACE

A 40-pin printed circuit edge card connector located at the left rear of the printer provides the means for connecting the printer to the host device. A mating connector for preparing a customer supplied interface cable may be procured from Centronics (P/N 31230032-1001). Two alternate mating connectors are 3M (P/N 3464-0001) and T & B Ansley (P/N 609-4015M). The physical and electrical characteristics, pin orientation, and connector pin-outs (Table 3-1) of the printer interface connector are shown below.

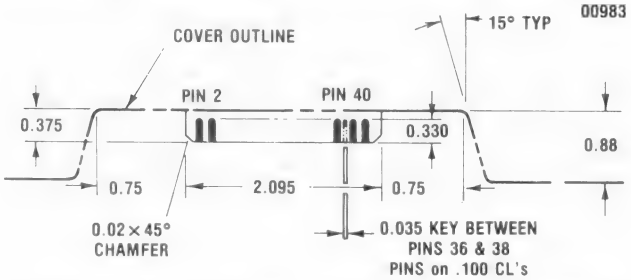


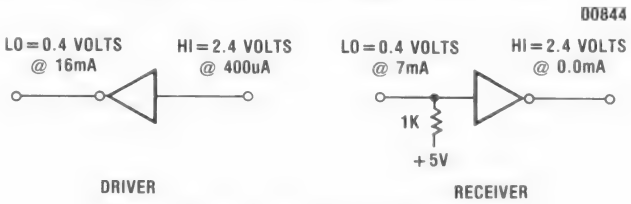
Figure 3-1 Top View, Printer Interface Connector

3.2 PRINTER INTERFACE CABLE

The printer interface cable is an accessory and is not supplied with the printer. The cable is 10 feet (3.04 meters) long, completely molded with a 40 pin edge connector on one end and a DB25 connector on the other end. The cable exits from the printer at a 45° angle to avoid the paper rack.

3.3 INTERFACE DRIVERS AND RECEIVERS

Figure 3-2 details the voltage range for the interface drivers and receivers. The interface receivers are terminated by 1K ohm resistors to +5V.



All input/output signals are TTL compatible.

Figure 3-2 Interface Drivers and Receivers

Table 3-1 Printer Interface Connector Pin-Outs

PIN	SIGNAL	PIN	SIGNAL
1	$\overline{\text{DATA STROBE}}$	2	Twisted Pair Ground
3	Data Bit 1	4	Twisted Pair Ground
5	Data Bit 2	6	Twisted Pair Ground
7	Data Bit 3	8	Twisted Pair Ground
9	Data Bit 4	10	Twisted Pair Ground
11	Data Bit 5	12	Twisted Pair Ground
13	Data Bit 6	14	Twisted Pair Ground
15	Data Bit 7	16	Twisted Pair Ground
17	Data Bit 8	18	Twisted Pair Ground
19	$\overline{\text{ACKNOWLEDGE}}$	20	Twisted Pair Ground
21	BUSY	22	Twisted Pair Ground
23	Not Used	24	Twisted Pair Ground
25	ON-LINE (SELECT)	26	Not Used
27	Signal Ground	28	+5V ($\overline{\text{FAULT}}$)
29	Not Used	30	Ground
31	Signal Ground	32 }	Pin 32 jumpered
33	Not Used	34 }	to pin 34
35	+5V SIGNAL	36	DEMAND
37 }	+17V	38	−17V
39 }	+17V	40	Not Used

See Figure 3-3 for Interface Timing Waveforms

3.4 ASCII CODES; PROPORTIONAL WIDTHS

Table 3-2 contains the 96 ASCII characters for the USA set, along with octal codes. Width values in the table are for proportional only. Table 3-3 contains the set "A" variable characters and octal codes for the 739.

Table 3-4 contains a numerical cross-reference to four number systems: hexadecimal, decimal, octal and binary for the user's convenience. Note that octal 177 (DELETE) is not active in the 739 printer.

Table 3-2 US ASCII Characters

00966

CODE	040	041	042	043	044	045	046	047
CHAR	*Space*	!	"	#	$	%	&	*Acute*
WIDTH *	7	7	10	15	12	16	14	7
CODE	050	051	052	053	054	055	056	057
CHAR	(	)	*	+	*Comma*	*Hyphen*	*Period*	*Slash*
WIDTH	7	7	12	12	7	12	7	12
CODE	060	061	062	063	064	065	066	067
CHAR	0	1	2	3	4	5	6	7
WIDTH	12	12	12	12	12	12	12	12
CODE	070	071	072	073	074	075	076	077
CHAR	8	9	:	;	<	=	>	?
WIDTH	12	12	7	7	12	12	12	12
CODE	100	101	102	103	104	105	106	107
CHAR	@	A	B	C	D	E	F	G
WIDTH	14	16	15	14	16	14	14	16
CODE	110	111	112	113	114	115	116	117
CHAR	H	I	J	K	L	M	N	O
WIDTH	16	10	14	16	14	18	16	16
CODE	120	121	122	123	124	125	126	127
CHAR	P	Q	R	S	T	U	V	W
WIDTH	14	14	15	12	14	16	16	18
CODE	130	131	132	133	134	135	136	137
CHAR	X	Y	Z	[	\	]	^	*Underline*
WIDTH	16	16	10	12	12	12	12	12
CODE	140	141	142	143	144	145	146	147
CHAR	*Grave*	a	b	c	d	e	f	g
WIDTH	7	12	12	10	12	12	10	12
CODE	150	151	152	153	154	155	156	157
CHAR	h	i	j	k	l	m	n	o
WIDTH	12	8	6	12	8	16	12	12
CODE	160	161	162	163	164	165	166	167
CHAR	p	q	r	s	t	u	v	w
WIDTH	12	12	10	12	10	12	12	16
CODE	170	171	172	173	174	175	176	177
CHAR	x	y	z	¦	*Rule*	¦	~	*NO-OP*
WIDTH	12	12	10	10	7	10	12	0

*Width values in table are for proportional

Table 3-3 Variable Characters for Country Set "A"

00967-A

COUNTRY*	043	044	100	133	134	135	136	140	173	174	175	176
U.S.A	#	$	@	[	\	]	^	`	{	|	}	~
FRANCE	£	$	à	°	ç	§	^	`	é	ù	è	¨
U.K.	£	$	@	[	\	]	^	`	{	|	}	~
GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
ITALY	£	$	§	°	é	|	^	ù	à	ò	è	ì
SWED/FIN	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü

*This chart contains elongated proportional characters for greater size and clarity. Refer to Figure 2-7 for switch settings to select country.

3.5 ASCII CROSS-REFERENCE

Table 3-4 provides a numeric cross-reference of the 128 ASCII codes. ASCII is the American Standard Code for Information Interchange. Note that some characters may vary, depending on the printer model or country character set. Refer to other tables for specific characters.

Table 3-4 Numeric Cross-Reference for ASCII Codes

00963

HX	DEC	OCT	BINARY	ASCII
00	0	000	0000000	NULL
01	1	001	0000001	SOH
02	2	002	0000010	STX
03	3	003	0000011	ETX
04	4	004	0000100	EOT
05	5	005	0000101	ENQ
06	6	006	0000110	ACK
07	7	007	0000111	BEL
08	8	010	0001000	BS
09	9	011	0001001	HT
0A	10	012	0001010	LF
0B	11	013	0001011	VT
0C	12	014	0001100	FF
0D	13	015	0001101	CR
0E	14	016	0001110	SO
0F	15	017	0001111	SI
10	16	020	0010000	DLE
11	17	021	0010001	DC1
12	18	022	0010010	DC2
13	19	023	0010011	DC3
14	20	024	0010100	DC4
15	21	025	0010101	NAK
16	22	026	0010110	SYN
17	23	027	0010111	ETB
18	24	030	0011000	CAN
19	25	031	0011001	EM
1A	26	032	0011010	SUB
1B	27	033	0011011	ESC
1C	28	034	0011100	FS
1D	29	035	0011101	GS
1E	30	036	0011110	RS
1F	31	037	0011111	US
20	32	040	0100000	SP space
21	33	041	0100001	! exclam
22	34	042	0100010	" quotes
23	35	043	0100011	# number
24	36	044	0100100	$ dollar
25	37	045	0100101	% percent
26	38	046	0100110	& amprsnd
27	39	047	0100111	' acute
28	40	050	0101000	(op paren
29	41	051	0101001	) cl paren
2A	42	052	0101010	* asterisk
HX	DEC	OCT	BINARY	ASCII

HX	DEC	OCT	BINARY	ASCII
2B	43	053	0101011	+ plus
2C	44	054	0101100	, comma
2D	45	055	0101101	– minus
2E	46	056	0101110	. period
2F	47	057	0101111	/ slash
30	48	060	0110000	0 zero
31	49	061	0110001	1 one
32	50	062	0110010	2 two
33	51	063	0110011	3 three
34	52	064	0110100	4 four
35	53	065	0110101	5 five
36	54	066	0110110	6 six
37	55	067	0110111	7 seven
38	56	070	0111000	8 eight
39	57	071	0111001	9 nine
3A	58	072	0111010	: colon
3B	59	073	0111011	; semicolon
3C	60	074	0111100	< less than
3D	61	075	0111101	= equals
3E	62	076	0111110	> gr than
3F	63	077	0111111	? question
40	64	100	1000000	@ at sign
41	65	101	1000001	A (UC)
42	66	102	1000010	B (UC)
43	67	103	1000011	C (UC)
44	68	104	1000100	D (UC)
45	69	105	1000101	E (UC)
46	70	106	1000110	F (UC)
47	71	107	1000111	G (UC)
48	72	110	1001000	H (UC)
49	73	111	1001001	I (UC)
4A	74	112	1001010	J (UC)
4B	75	113	1001011	K (UC)
4C	76	114	1001100	L (UC)
4D	77	115	1001101	M (UC)
4E	78	116	1001110	N (UC)
4F	79	117	1001111	O (UC)
50	80	120	1010000	P (UC)
51	81	121	1010001	Q (UC)
52	82	122	1010010	R (UC)
53	83	123	1010011	S (UC)
54	84	124	1010100	T (UC)
55	85	125	1010101	U (UC)
HX	DEC	OCT	BINARY	ASCII

HX	DEC	OCT	BINARY	ASCII
56	86	126	1010110	V (UC)
57	87	127	1010111	W (UC)
58	88	130	1011000	X (UC)
59	89	131	1011001	Y (UC)
5A	90	132	1011010	Z (UC)
5B	91	133	1011011	[open brkt
5C	92	134	1011100	\ left slash
5D	93	135	1011101	] close brkt
5E	94	136	1011110	^ circumflex
5F	95	137	1011111	_ underline
60	96	140	1100000	` grave
61	97	141	1100001	a (lc)
62	98	142	1100010	b (lc)
63	99	143	1100011	c (lc)
64	100	144	1100100	d (lc)
65	101	145	1100101	e (lc)
66	102	146	1100110	f (lc)
67	103	147	1100111	g (lc)
68	104	150	1101000	h (lc)
69	105	151	1101001	i (lc)
6A	106	152	1101010	j (lc)
6B	107	153	1101011	k (lc)
6C	108	154	1101100	l (lc)
6D	109	155	1101101	m (lc)
6E	110	156	1101110	n (lc)
6F	111	157	1101111	o (lc)
70	112	160	1110000	p (lc)
71	113	161	1110001	q (lc)
72	114	162	1110010	r (lc)
73	115	163	1110011	s (lc)
74	116	164	1110100	t (lc)
75	117	165	1110101	u (lc)
76	118	166	1110110	v (lc)
77	119	167	1110111	w (lc)
78	120	170	1111000	x (lc)
79	121	171	1111001	y (lc)
7A	122	172	1111010	z (lc)
7B	123	173	1111011	{ op brace
7C	124	174	1111100	vert rule
7D	125	175	1111101	} cl brace
7E	126	176	1111110	¯ overscore
7F	127	177	1111111	DEL
HX	DEC	OCT	BINARY	ASCII

3.6 INPUT AND OUTPUT SIGNALS

DATA STROBE—The data strobe is a negative-going signal which transfers data from the host device to the printer logic. The pulse duration must be one microsecond minimum. The leading and trailing edges of the data strobe and input data must be as shown in Figure 3-3.

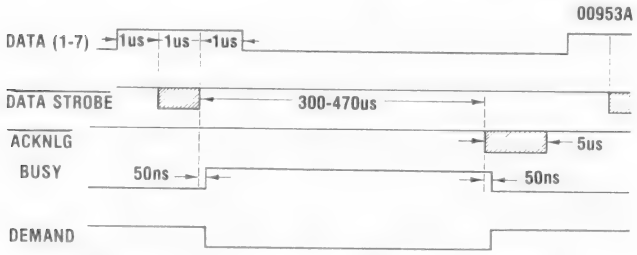


Figure 3-3 Interface Timing Diagram

DATA BITS DB1-DB7—Data bits 1 through 7 contain ASCII character and control code information. Data bit levels are positive true logic (+5V = logic1).

ACKNLG (Pin 19)—Acknowledge is a negative-going pulse that informs the host device that the printer logic has received and processed the last code sent, and that another code may be sent. If the printer logic receives a CR (Carriage Return) code or if the buffer becomes full, Acknowledge does not occur until after the line is printed or until the line feed buffer has room for more line feeds.

BUSY (Pin 21)—Busy is a positive-going signal which inhibits data transmission from the host. Busy goes positive on the trailing edge of Acknowledge. No data can be sent by the host when Busy is high.

DEMAND (Pin 36)—Demand is the inverse of Busy. When Demand is high, data can be transmitted by the host.

+5V SIGNAL (Pin 35)—The +5V Signal indicates to the host device that the printer power is on and the logic supply is at the correct voltage.

SELECT (Pin 25)—When the front panel switch is in the ONLINE position, SELECT sends a positive-going level to the host to prepare the transmission of data to the printer. A Paper Empty situation de-selects the printer to inhibit host transmission until paper is replenished.

Table 3-5 Control Codes

MNEMONIC	DECIMAL	OCTAL	HEXADECIMAL	FUNCTION
LF	10	012	0A	Full Line Feed Forward
CR	13	015	0D	Print Command
FF	12	014	0C	Top of Form (66 lines)
ESC, SOH	27, 01	033, 011	1B, 01	1 Dot Space
ESC, STX	27, 02	033, 002	1B, 02	2 Dot Spaces
ESC, ETX	27, 03	033, 003	1B, 03	3 Dot Spaces
ESC, EOT	27, 04	033, 004	1B, 04	4 Dot Spaces
ESC, ENQ	27, 05	033, 005	1B, 05	5 Dot Spaces
ESC, ACK	27, 06	033, 006	1B, 06	6 Dot Spaces
ESC, LF	27, 10	033, 012	1B, 0A	Full Line Feed Reverse
ESC, SO	27, 14	033, 016	1B, 0E	Start Elongated Print
ESC, SI	27, 15	033, 017	1B, 0F	Stop Elongated Print
ESC, DC1	27, 17	033, 021	1B, 11	Select Proportional
ESC, DC3	27, 19	033, 023	1B, 13	Select 10 cpi Monospaced
ESC, DC4	27, 20	033, 024	1B, 14	Select 16.7 cpi Monospaced
ESC, FS	27, 28	033, 034	1B, 1C	Half Line Feed Forward
ESC, RS	27, 30	033, 036	1B, 1E	Half Line Feed Reverse
ESC, %, 0	27, 37, 48	033,045,060	1B, 25, 30	Enable Graphics
SI	15	017	0F	Start Underline
SO	14	016	0E	Stop Underline
BS*	08	010	08	Backspace

*BS must be followed by a number (1 to 126) that defines the dot spaces to Backspace.

3.7 HOST-GENERATED CONTROL CODES

SUMMARY—Control codes are sent to the printer along with character codes via the input data lines. Control codes are interpreted as instructions by the printer. Table 3-5 contains a summary of the control codes and sequences recognized by the printer. Each of the codes is described in detail in the following paragraphs.

LINE FEED—Each LF code received by the printer causes the paper to advance one line (one-sixth inch). Consecutive line feeds are received at the character code rate, but the first LF code is acted upon immediately and subsequent LF codes are counted, pending execution by the roller stepper motor. As each LF is executed, the count is decremented until all LF codes are executed and the Line Feed Counter has a count of zero. If a stream of LF codes causes the count to be 255, the Busy signal stays active until the count is decremented (by one). Whenever an LF code is sent after text, the text is printed before the LF code(s) is executed, and text following the LF code will be printed on the line below. Note that LF codes do not reset the character count (or dot position count) thus, text following LF codes will not be printed starting at the left margin unless a CR code is sent prior to the LF code.

CARRIAGE RETURN—A CR code is a print command and carriage-return function. Receipt of a CR code causes immediate printing of characters in the character buffer, then the carriage returns to the left margin and the character count (or dot position count) is reset to zero. The printer logic generates a CR code on a buffer full condition. Buffer full equals 80 characters in 10 cpi monospaced mode, or 132 characters in 16.7 cpi monospaced mode, or 1186 dot positions in proportional spaced (or mixed proportional spaced and 16.7 cpi monospaced mode).

SPACING FOR JUSTIFICATION—Right justification of the proportional or 16.7 cpi monospaced characters may be accomplished using spacing commands ESC, SOH (1 dot space); ESC, STX (2 dot spaces); ESC, ETX (3 dot spaces); ESC, EOT (4 dot spaces); ESC, ENQ (5 dot spaces) and ESC, ACK (6 dot spaces). The host device must provide the appropriate control codes so that the printed text is right justified at the desired line measure up to 8 inches. Note that after 1185 dot positions, the next character received forces a CR code to end the line. Right justification is not recommended for 10 cpi monospaced.

FULL LINE FEED REVERSE—ESC, LF activates one line feed (one-sixth inch) in reverse. Text prior to the ESC, LF code sequence is printed before execution of the reverse line feed. The character count (or dot position count) is not changed; thus, characters following ESC, LF will be printed one line above the previous text.

ELONGATED CHARACTERS—An ESC, SO code causes all subsequent characters to be printed double width (elongated). The reception of an ESC, SI code sequence or end of a print line terminates elongated characters. Elongated character start and stop (ESC, SO; ESC, SI) may be entered any number of times within a line and can be used with 10 cpi monospaced, 16.7 cpi monospaced and proportional character sets.

SELECT PROPORTIONAL—ESC, DC1 code sequence selects the proportional set to begin a line (terminating the present character set) or may be sent by the host in a line containing 16.7 cpi monospaced for style mixing. The logic will accommodate mixing of proportional and 16.7 cpi monospace, but 10 cpi mixing is not recommended. Proportional characters are terminated by selecting another character set (ESC, DC3 or ESC, DC4).

SELECT 10 CPI MONOSPACED—The primary character set is 10 cpi monospaced, selected by the printer logic during initialization, or by ESC, DC3. The selection of the 10 cpi character set should be done only at the beginning of the line, and the other two sets should not be mixed with it. 10 cpi monospaced is terminated by selecting another character set (ESC, DC1 or ESC, DC4) at the beginning of a new line.

SELECT 16.7 CPI MONOSPACED—When ESC, DC4 is received, all following text will be printed in 16.7 cpi monospaced, providing a 132 character-per-line capability. If desired, ESC, DC1 may be sent within the same line to set proportional characters for style mixing. 16.7 cpi monospaced characters may be terminated by selecting another character set (ESC, DC1 at any point; ESC, DC3 at the beginning of the next line).

HALF LINE FEED FORWARD—The receipt of an ESC, FS sequence causes immediate printing of text, then the paper is advanced one-half line (one-twelfth inch). A new baseline is created for any text that follows; thus, this function can be used for subscript characters. The original

baseline can be reinstated using an ESC, RS code sequence; the subscript characters will be printed, then the paper will move one-half line in reverse, back to the original baseline.

HALF LINE FEED REVERSE—ESC, RS causes immediate printing of previous text, then the paper is moved in reverse one-half line (one-twelfth inch). A new baseline is created for any text that follows; thus, this function can be used for superscript characters. The original baseline can be reinstated using an ESC, FS code sequence; the superscript characters will be printed, then the paper will move one-half line forward (to the original baseline).

START UNDERLINE, STOP UNDERLINE—Receipt of an SI code causes all following characters to be underlined. Underlining is accomplished by driving pin 9 to create a continuous, unbroken line until an SO code is received, which terminates the underlining. End of printed line does not terminate underlining. Proportional descenders will touch the underline, as they are partly formed by the 9th pin. Monospaced 10 cpi and 16.7 cpi character descenders are above the underline.

BACKSPACE N DOT POSITIONS—The printer may be backspaced from 1 to 126 dot positions by the BS, "N" sequence. "N" is a 7-bit digital value from 0000001 to 1111110 to define the backspace number. The receipt of BS, "N" causes immediate printing of previous text, the carriage returns to the left margin then moves out to the new dot position. If greater than 126 dot position backspace is desired, consecutive BS, "N" codes may be sent. If "N" exceeds the present dot position, the character pointer is reset to zero. If BS, NULL (N = 0) is sent, no operation takes place; the code sequence is ignored (NO-OP). BS, "N" cannot be sent after the 80th character (10 cpi), 132nd character (16.7 cpi) or 1186th dot position, as a buffer full condition causes the line to be terminated and printed automatically.

BACKSPACING CHARACTERS—For backspacing of a character or space, the code sequences for the three basic character sets are shown in Table 3-6. The second number in each command represents the dot width of a character or space for that character set. To backspace for elongated characters, this number must be doubled.

TOP OF FORM—Receipt of a FF (Form Feed) code causes the printer to advance paper one form length (66 lines; 11 inches; 279 mm) for domestic units and either 66 lines or 72 lines (12 inches; 305 mm) for international units.

SELECT GRAPHICS—Receipt of the sequence ESC, %, 0 activates the graphics program. Dot resolution for graphics is 75 dots per inch horizontal, and 72 dots per inch vertical. 594 bytes of graphic data make a complete line (8 inches; 203 mm) and the printer software forces one-half line feed and a carriage return (with Auto Line Feed enabled). Graphics is terminated by a proper escape sequence such as ESC, DC1 (select proportional mode).

3.8 PROGRAMMING CONSIDERATIONS

SUMMARY—The printer is controlled by the host device which must be programmed to provide the proper instructions to the printer for desired outputs. The following is a summary of the items which should be considered when programming the host device.

- When the printer is turned on, normal 10 cpi monospaced characters are automatically selected.
- 10 cpi monospaced characters cannot be intermixed with proportional or condensed characters in the same line.
- The use of justification codes with 10 cpi monospaced characters is not recommended.
- Elongated characters are automatically terminated at the end of a line.

Table 3-6 Backspacing Characters

CH SET	DOTS	CODE	HEX	DECIMAL	OCTAL	BINARY
10 cpi	10	BS, 10	08, 0A	08, 10	10, 12	0001000, 0001010
16.7 cpi	9	BS, 9	08, 09	08, 09	10, 11	0001000, 0001001
Prop*	6-18*	BS, N*	08, N*	08, N*	10, N*	0001000, xxxxxxx*

*For proportional character dot widths, refer to Table 3-2.

- Underline is NOT terminated at the end of a line and continues until a terminating command (SO) is sent by the host device.
- When the auto line feed after carriage return function is enabled the print head moves to left margin after printing, then paper is advanced one line.
- When the auto line feed after carriage return is disabled the print head moves to the left margin after printing, but paper is NOT advanced. When in this mode all carriage return (CR) commands should be immediately followed by a line feed command to prevent overprinting.
- Half line feed commands (forward or reverse) cause printing prior to the line feed. The print head is returned to the left margin after printing, then moves out to the position where the last character ended.
- Half line feeds cause new character baselines one half space below (forward) or above (reverse) the former baseline. When subsequent data is printed it will be printed on the new baseline.
- Sequential line feeds, partial or full, are logically summed prior to their execution.
- A line feed command (full or half) causes immediate printing of all preceding data in a line prior to execution of the line feed. The print head is moved to the left margin after printing, then moves to the position above or below the last character printed.
- A CR command causes all preceding data in a line to be printed then returns the print head to left margin.
- A backspace control code (BS, "N") cannot be sent after the 80th character (10 cpi), 132nd character (16.7 cpi), or 1186th dot position (proportional) as a buffer full condition would occur causing the line to be printed prior to the receipt of the backspace command.

3.9 JUSTIFICATION CODE SEQUENCES—

Proportional or condensed (16.7) character styles may be right justified using a host device program. Right justification is accomplished by adjusting the width of spaces between words and/or characters. The justification control code sequences allow "dot spaces" to be inserted anywhere within a line of data, between words or between characters. The justification control code sequences are listed in Table 3-7.

Line lengths may be extended by inserting dot spaces between words or between characters as desired within a line of data. Line lengths may be compressed by replacing normal spaces (normal space = 7 dot columns) with shorter dot spaces.

The following items must be considered when preparing a host device control program.

DOT COLUMNS—Dot column spacing may be calculated from the following values:

- Maximum Line Length = 1185 dots
- Dot Column Density = 150 dots/inch
- Dot Column Width = 0.00666 inches/dot

Note that when preparing host device right-justification programs, the longest line to be considered is 1185 dot columns in length. This is because lines of data sent to the printer which exceed 1185 dot columns in length cause a buffer-full condition in the printer. This results in automatic printing of the line of data, causes loss of print control by the host device, and random lengths of lines may result.

PROPORTIONAL CHARACTERS—Proportional characters vary in width from 6 to 18 dot spaces. The host device justification program must accommodate proportional character dot widths. Table 3-2 shows the proportional characters arranged in ascending ASCII code.

Table 3-7 Justification Codes

ASCII	DECIMAL	OCTAL	HEX	FUNCTION
ESC, SOH	27, 01	033, 001	1B, 01	One Dot Space
ESC, STX	27, 02	033, 002	1B, 02	Two Dot Spaces
ESC, ETX	27, 03	033, 003	1B, 03	Three Dot Spaces
ESC, EOT	27, 04	033, 004	1B, 04	Four Dot Spaces
ESC, ENQ	27, 05	033, 005	1B, 05	Five Dot Spaces
ESC, ACK	27, 06	033, 006	1B, 06	Six Dot Spaces

CONDENSED (16.7 CPI) CHARACTERS—Condensed (16.7 cpi) characters are formed using a 7 × 8 character matrix. When printing condensed characters the printer electronics automatically adds a two dot intercharacter spaced following each character. For programming purposes, all condensed (16.7 cpi) characters including normal spaces are 9 dot spaces wide. Table 3-2 may be used as a reference for the ASCII codes for each condensed character, but dot widths shown are for proportional characters only.

MIXED PROPORTIONAL AND CONDENSED CHARACTERS—Proportional and condensed (16.7 cpi) characters may be intermixed within a line. The host device justification program must be able to accommodate dot column widths for both proportional and condensed characters when they are printed in the same line.

ELONGATED CHARACTERS—Elongated characters may be intermixed with normal characters within a line. The dot widths for elongated characters are twice those of normal characters.

3.10 GRAPHIC CODES

The graphics program is completely controlled by the host, with the exception of the printer logic forcing a CR (Carriage Return) when the graphic buffer is full (594 codes). Table 3-8 contains all 64 possible graphic code patterns. Graphic codes shown are in decimal and hexadecimal. Each code is graphic data plus 32 decimal.

The hosts sends ESC, %, 0 followed by graphic data. If 594 graphic codes are sent in one line, the printer software forces a CR (Carriage Return). With Automatic Line Feed enabled, a one-half line feed will follow the carriage return. With the Automatic Line Feed disabled, an overprint will occur unless an LF (10 decimal) is sent after the 594th byte. LF is normally a full line feed, but in the graphic program the software converts LF to one-half line feed to prepare for the next graphic line.

A graphic line of less than 594 bytes can be terminated by sending a CR (13 decimal). The Automatic Line Feed statement above applies here also.

After all graphic data is sent, the graphic program is terminated by any proper ESC sequence.

SECTION 4
OPERATION

4.1 CONTROLS AND INDICATORS

The printer controls and indicators are illustrated in Figure 4-1 and described in Table 4-1.

4.2 OPERATING PROCEDURES

1. Ensure that a ribbon is installed in the printer and an adequate supply of paper has been installed (see paragraph 2.3 for paper installation).

2. Place ONLINE/LOCAL switch in the LOCAL position. This prevents the printer from printing.

CAUTION

When turning power on or off, the ONLINE/LOCAL switch should always be placed in the LOCAL position to prevent erroneous communications.

3. Place POWER ON/OFF switch in ON position. "Power On" LED should be visible through paper-exit slot.
4. In LOCAL position, the FWD/REV switch may be used for manual line feed.
5. Place ONLINE/LOCAL switch in the ONLINE position. Printer is ready to accept data.
6. To turn printer off, place ONLINE/LOCAL switch in LOCAL position. Then, place POWER ON/OFF switch in OFF position.

Table 4-1 Control and Indicator Functions

INDEX NUMBER	CONTROL/INDICATOR	FUNCTION
1	POWER switch	When set in the ON position, applies power to printer circuits.
2	ONLINE/LOCAL switch	When set in the LOCAL position, prevents printer from printing and keeps printer "off line." When set in the ONLINE position, printer is ready to receive data.
3	FWD/REV Switch	Manual line feed control (LOCAL Position)
4	Red LED	Indicates power is ON (+5 volts). LED is visible through the paper exit slot.
5	Pinch Roll Release Lever	Set in the OPEN position to load paper. NOTE: When using roll paper or single sheets, set lever in the CLOSED position. When using fanfold paper, set lever in the OPEN position.

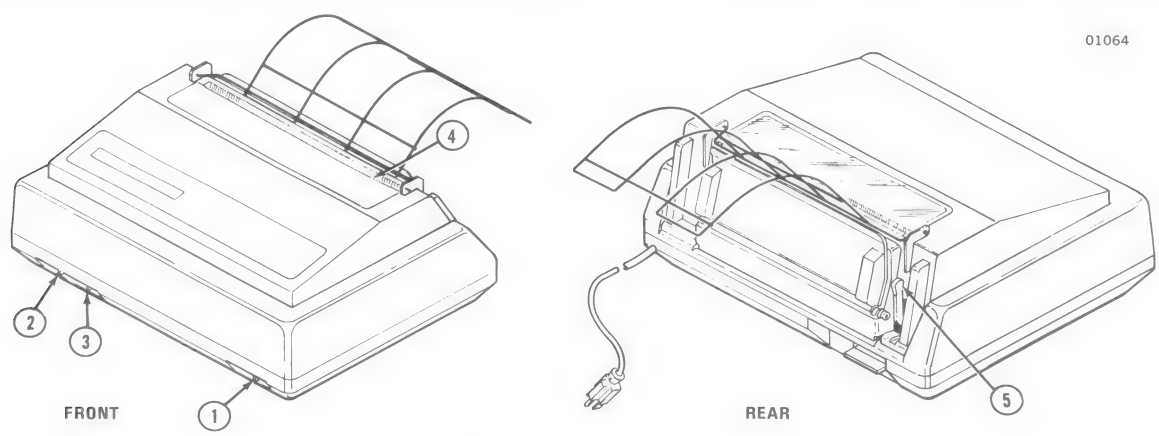


Figure 4-1 Controls and Indicators

4.3 OPERATING NOTES

- Always plug printer into a 3-wire grounded outlet.
- Place printer on a typewriter pad for quieter operation.
- Do not place objects on any part of printer.
- Do not subject printer to: temperatures below +40°F (4°C) during operation; a sudden change in temperature; dust; moisture; or extreme shock.
- Use only a dry, soft cloth to clean printer surfaces. Do not use harsh detergents or chemicals.
- Avoid touching face of printhead when handling paper or changing ribbons.
- Periodically clean ink build-up from ribbon guide path and remove paper dust from interior.

SECTION 5
OPERATOR MAINTENANCE

5.1 PREVENTIVE MAINTENANCE (P.M.)

Routine preventive maintenance should be performed at regular intervals to insure satisfactory performance of the printer. Preventive maintenance consists of periodic cleaning, inspection, and lubrication. The recommended preventive maintenance and suggested frequencies are shown below. The preventive maintenance may be required more or less frequently than indicated depending upon printer application, operating environment and type of paper used.

WARNING

The power plug must be removed from the power outlet before performing this procedure; otherwise, a potential shock hazard exists in the area being serviced.

CAUTION

Care must be taken when performing the preventive maintenance procedures outlined in Table 5-1. Damage to the printer resulting from performing these procedures may void the warranty.

Table 5-1 Preventive Maintenance

ITEM	FREQUENCY	PROCEDURE
Internal Inspection	Each Ribbon Change	Visually inspect interior of printer for loose wires, connectors, and hardware, chafing of cables, and worn or damaged parts.
Print Head and Carriage	Each Ribbon Change	After removing ribbon, use a light-bristle brush to carefully remove dust and residue from print head and carriage assembly.
Print Head	Each Ribbon Change	Using a lint-free cloth gently remove all dried ink from the front of the print head.
Carriage Guide Bars	6 Months	Move print head to left side of printer. Apply several drops of lubricating oil to a lint-free cloth and lightly rub carriage guide bars to remove any build up of residue. Move print head to right side of printer and repeat procedure.
Paper Drive Roller	6 Months	Using a lint-free cloth clean the paper drive roller and plate bushings. After cleaning, apply one drop of lubricating oil to the paper roller and plate bushings. Cycle the paper roller using the thumbwheels to allow oil to seep into bushings.
External Cleaning	As Required	Clean all external surfaces using a mild detergent and a lint-free cloth.

5.2 TROUBLESHOOTING

See WARNING in paragraph 5.1. The troubleshooting guide, Table 5-2 lists some malfunctions which may occur, the probable causes and the remedies. If the equipment remains inoperative after performing the remedies indicated, the equipment should be serviced by qualified service personnel (Centronics Factory Service Center or Authorized Service Dealer personnel.) Note that the warranty is voided if attempts to repair the printer result in further damage.

Table 5-2 Troubleshooting Guide

TROUBLE	PROBABLE CAUSE	REMEDY
Print too light.	Print Head release lever open or partially open.	Rotate print head release lever clockwise to normal printing position (see Figure 2-5).
	Worn or defective ribbon	Replace ribbon per paragraph 2.4.
Roll Paper/Single Sheet paper does not advance.	Pinch roller release lever in open position.	Pull pinch roller release lever forward to closed position.
Ribbon does not feed properly.	Ribbon twisted or improperly loaded.	Check ribbon threading diagram (Figure 2-6) and correct as required.
	Ribbon drive rollers not engaged properly.	Open and release driven roller. Rotate driven roller clockwise to assure proper movement of ribbon.
Printer completely inoperative.	AC input plug not connected.	Connect AC input plug to power source.
	Paper Jam	Set POWER switch to OFF position and carefully clear paper jam. Check condition of ribbon before setting POWER switch to ON position.
	Fuse F3 blown.	Check if "Power On" LED is lit by looking down through paper exit slot. If not lit, replace fuse F3. (Refer to Disassembly Procedures paragraph 5.4).
Power applied/data sent —printer does not print.	Cable between input device and printer not connected.	Check that connectors at both ends of data input cable are properly connected to mating connectors.
	ONLINE switch in LOCAL position.	Place switch in ONLINE position.
	Paper supply exhausted.	Replenish paper.

5.3 REMOVAL OF COVER ASSEMBLIES

In order to visually inspect the interior of the printer and to replace fuse F3, it is necessary to remove the cover assemblies. Refer to Figure 5-1 and perform the following:

WARNING

The power plug must be removed from the power outlet before performing the preventive maintenance procedures; otherwise, a potential shock hazard exists in the area being serviced.

CAUTION

Performance of the following procedure by unauthorized personnel during the warranty period will void the warranty. Refer to the Warranty for details.

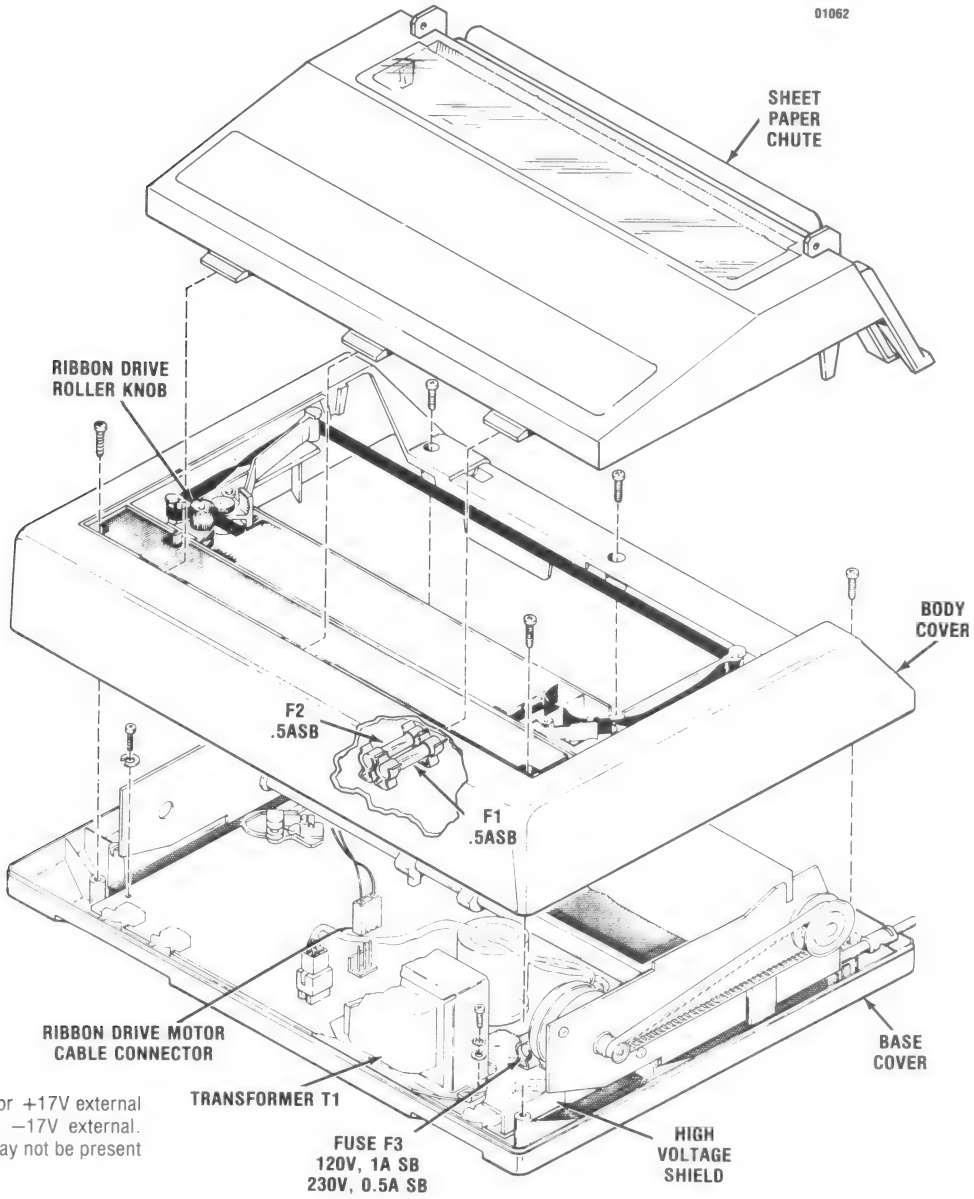
1. Place POWER ON/OFF switch in OFF position and disconnect AC input plug from power source. Disconnect data input connector.
2. Remove top cover by lifting rear edge until latches are clear of body cover and then slide cover towards rear of printer to disengage front clips.
3. Unthread the ribbon from the print head/carriage assembly, then take up slack in ribbon by turning ribbon drive roller knob clockwise.
4. Release the two Phillips-head screws at the front of the printer and the three Phillips-head screws at the rear of the printer using a No. 1 Phillips screwdriver.
5. Gradually raise the body cover until there is enough room to reach under the front of the cover.
6. Reach under the body cover and disconnect the ribbon drive motor cable connector from connector J001 on the logic pc board.
7. Keep the body cover level to prevent ribbon from unthreading and set cover to one side.
8. To reassemble printer, reverse procedure.

5.4 FUSE REPLACEMENT

See WARNING and CAUTION in paragraph 5.3.

Fuse F3 (line fuse) is located on the forward right-hand corner of the logic P.C. board adjacent to the power transformer and POWER ON/OFF switch. Refer to Figure 5-1 and proceed as follows:

1. Disassemble cover assemblies per paragraph 5.3 to gain access to logic P.C. board mounted to the base cover.
2. Loosen screw, located on right side of transformer using a Phillips screwdriver.
3. Remove the clear plastic high voltage shield covering the fuse and AC input circuits.
4. Remove and replace the defective fuse with one of the same value:
   - 739-1; 1A Slow Blow
   - 739-2; 0.5A Slow Blow
5. Reinstall the high voltage shield. Make sure that the slotted portion of the shield is under the flat washer.
6. Tighten the Phillips-head screw to secure the shield.
7. Reassemble the cover assemblies.



NOTE: F2 is for +17V external and F1 is for −17V external. These fuses may not be present in this printer.

Figure 5-1 Removal of Cover Assemblies

5.5 SELF-TEST PROCEDURE

This printer contains a self-test function that checks all electromechanical functions and virtually all electronic circuits. To perform the self-test, refer to Figure 2-7 for the location of Switchpack S5 and perform the following:

1. Front panel switch to LOCAL and Power switch to OFF.
2. Remove top cover and carefully set all S5 switches to ON, using an eraser at the end of a pencil.
3. Install roll paper or fanfold paper (a single sheet will be ejected by the TOF).
4. Replace cover, plug power in and turn power ON.
5. Place front panel switch in ONLINE position. The printer will perform a TOF (Top of Form) followed by the printing of "rolling ASCII" characters. The first 96 characters will be underlined. Figure 5-2 is a sample of the self-test pattern (reduced).

Self test is terminated by placing the front panel switch in the LOCAL position, turning power OFF and setting Switchpack S5 to enable the desired character set (see Figure 2-7).

Figure 5-2 Self-Test Pattern

739 OPERATORS MANUAL ADDENDUM A

FOR EXTENDED BASE PRINTERS

739-2L, 739-3B, 739-4B, 739-4BL

CONTENTS

1 DESCRIPTIONS OF MODELS COVERED
2 SPECIFICATIONS
3 INTERFACE INFORMATION
4 OPERATION
5 PRINCIPLES OF OPERATION

1 DESCRIPTIONS OF MODELS COVERED

1.1 Comparison Chart—Table 1-1 shows the models covered in this addendum and lists the basic differences between them. The paragraphs which follow describe the individual printers in more detail. For those printers with VDE compliance, refer to paragraph 1.6 for the details of VDE.

1.2 Model 739-2L—The 739-2L is an international, parallel-input (7 bits) printer with 238 mm pinfeed roller. This printer is functionally identical to the 739-2 except that it is configured with an extended base for VDE compliance and has the longer pinfeed roller. Power is 230 V, 50 Hz and is fused at 0.8A. The European power plug has 2 round male prongs with a female ground socket (P/N 39620021-1001). The interface connector has 36 pins (female) (P/N 31230042-1001).

1.3 Model 739-3B—The 739-3B is a domestic, serial-input printer with 228 mmm pinfeed roller. The front-panel controls and line fuse locations are identical to the 739-1 printer. The extended base contains a serial interface PCB whose switchpacks (SW1, SW2) allow selection of baud rate, parity, printer status etc. These switch settings are illustrated in Figure 3-5. This model has a 2K byte input buffer on the Serial I/F PCB. The power cord is standard 115 V, 15A with 2 flat prong, grounded plug (NEMA 5-15P). The interface connector (DB25) is a 25-pin female connector.

1.4 Model 739-4B—The 739-4B is an international, serial-input printer with 228 mm pinfeed roller and complies with VDE standards. The extended base contains a serial interface PCB whose switchpacks (SW1, SW2) allow selection of baud rate, parity, printer status etc. These switch settings are illustrated in Figure 3-5. This model has a 2K byte input buffer on the Serial I/F PCB. Power is 230 V, 50 Hz and is fused at 0.8A. The European power plug has 2 round male prongs with a female ground socket (P/N 39620021-1001). The interface connector (DB25) is a 25-pin female connector.

1.5 Model 739-4BL—The 739-4BL is identical to the 739-4B (paragraph 1.4) except that it contains the longer 238 mm pinfeed roller.

1.6 VDE Compliance—Models 739-2L, 739-4B, and 739-4BL comply with VDE standards. The Power ON/OFF switch is located on the rear of the extended base. Both wires of the AC power are switched, and a line interference filter is contained in the extended base compartment. The line fuse and a spare fuse are contained in a small, pull-out fuse holder directly under the power connector, which must be removed in order to access the fuse holder. When power is ON, a green LED lights at the front panel. The print head on VDE units is shielded.

2 SPECIFICATIONS

2.1 Model 739-2L—The specifications for the 739-2L are identical to the 739-2 except for size and weight. The 739-2L has the longer (238 mm) pinfeed roller. Refer to the 739-1/739-2 Operators Manual (37400911) for specifications other than those below.

- Size . . . . . 14½"W × 16"D × 5¾"H (368 mm × 406 mm × 146 mm)
- Weight . . . . . 16 lb. (7.2 kg)
- Input Connector . . . . . 36-pin female

2.2 Model 739-3B—The specifications for the 739-3B are shown below. Refer to the 739-1/739-2 Operators Manual for specifications other than those below.

- Baud Rate . . . . . 50 to 19,200 baud (factory set at 9600 baud)
- Input Buffer . . . . . 2048 bytes; 1792 bytes indicates buffer full 256 bytes indicates buffer empty
- Input Connector . . . 25-pin EIA female (DB25, RS232C)
- Input Data Format* . . . . . Start bit, 7 data bits, parity bit, 1 or 2 stop bits
- RS232C Levels . . Mark = True = Logic 1 = −3V to −25V Space = False = Logic 0 = +3V to +25V
- Input Voltage/Frequency . . . . . 120 VAC nominal, +5% −10%; 60 Hz ±1 Hz
- Size . . . . . 14½"W × 16"D × 5.75"H (368 mm × 406 mm × 146 mm)
- Weight . . . . . 16 lb. (7.2 kg)

* 7 or 8 data bits, switch selectable; parity even/odd or no parity, switch selectable.

Table 1-1 739 Model Comparison Chart

Model	Voltage/Freq.	Serial/Parallel	VDE	Pinfeed	Input Connector
739-2L	230 V, 50 Hz	Parallel 7 bits	Yes	238 mm	36 PIN (F)
739-3B	120 V, 60 Hz	Serial RS232C	No	228 mm	DB25 (F)
739-4B	230 V, 50 Hz	Serial RS232C	Yes	228 mm	DB25 (F)
739-4BL	230 V, 50 Hz	Serial RS232C	Yes	238 mm	DB25 (F)

2.3 Models 739-4B, 739-4BL—The specifications for the 739-4B and 739-4BL are shown below. The specifications for both models are the same, except that the 739-4BL has the longer (238 mm) pinfeed roller. Refer to 739-1/739-2 Operators Manual for specifications other than those below.

- Baud Rate . . . . . 50 to 19,200 baud (factory set at 9600 baud)
- Input Buffer . . . . . 2048 bytes; 1792 bytes indicates buffer full 256 bytes indicates buffer empty
- Input Connector . . . 25-pin EIA female (DB25, RS232C)
- Input Data Format* . . . . . Start bit, 7 data bits, parity bit, 1 or 2 stop bits
- RS232C Levels . . Mark=True=Logic 1= −3V to −25V Space = False = Logic 0 = +3V to +25V
- Input Voltage/Frequency . . . . . 230 VAC nominal, +10% −5%; 50 Hz ±1 Hz
- Size . . . . . 14½″W × 16″D × 5.75″H (368 mm × 406 mm × 146 mm)
- Weight . . . . . 16 lb. (7.2 kg)

* 7 or 8 data bits, switch selectable; parity even/odd or no parity, switch selectable.

3 INTERFACE INFORMATION

3.1 Model 739-2L—The 739-2L (parallel) interface signals and levels are identical to the 739-2, but the interface connector on the 737-2L has 36 pins compared to the 739-2's 40 pins. The +17V and −17V power supplies are not accessible through the 36-pin connector. The pin-outs for the 739-2L are shown in Table 3-1 and the 36-pin connector (P/N 31230042-1001) is illustrated in Figure 3-1. Interface signals and levels are contained in the 739-1/739-2 Operators Manual (37400911).

Table 3-1 739-2L Interface Connector Pin-Outs

PIN	SIGNAL
1	$\overline{\text{DATA STROBE}}$
2	Data Bit 1
3	Data Bit 2
4	Data Bit 3
5	Data Bit 4
6	Data Bit 5
7	Data Bit 6
8	Data Bit 7
9	Data Bit 8
10	$\overline{\text{ACKNOWLEDGE}}$
11	BUSY
12	Not Used
13	ON-LINE (SELECT)
14	Signal Ground
15	Not Used
16	Signal Ground
17	Not Used
18	+5V (Power Up)
19	Twisted Pair Ground
20	Twisted Pair Ground
21	Twisted Pair Ground
22	Twisted Pair Ground
23	Twisted Pair Ground
24	Twisted Pair Ground
25	Twisted Pair Ground
26	Twisted Pair Ground
27	Twisted Pair Ground
28	Twisted Pair Ground
29	Twisted Pair Ground
30	Twisted Pair Ground
31	Not Used
32	+5V ($\overline{\text{FAULT}}$)
33	Ground
34	Pin 34 jumpered
35	to pin 35
36	DEMAND

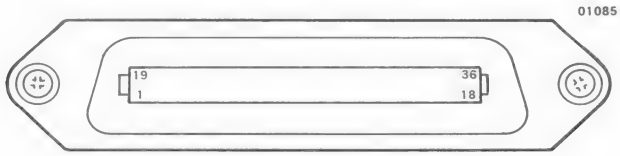


Figure 3-1 Interface Connector (739-2L)

3.2 Interface Signals; 739-3B, 739-4B, 739-4BL

These serial models are configured with a 25-pin female connector (DB25). The format is RS-232C. Table 3-2 summarizes the active lines; all other pins are open-circuited. Figure 3-2 illustrates the pin positions on the DB25 connector.

00972

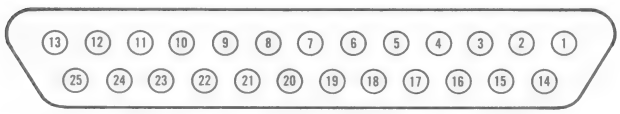


Figure 3-2 25-Pin Female Input Connector (DB 25)

3.3 Interface Signal Levels (RS-232C)—Refer to Figure 3-3. Serial Data received at J101, Pin 3 (EIA connector) must conform to the signal levels defined below. A Logic 1 is −V (−3V to −25V) and is defined as a MARK. A Logic 0 is +V (+3V to +25V) and is defined as a SPACE. When Pin 3 is released, the line should go to a MARK (−V) condition.

Indeterminate Region—As shown in Figure 3-3, the +3V to −3V region must be avoided, as the receiving electronics cannot determine Logic 1 or Logic 0 reliably with signals in this region.

00975

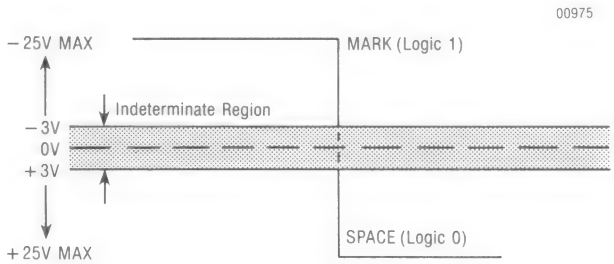


Figure 3-3 RS-232C Signal Levels

Table 3-2 Serial Interface Signals (RS-232C)

(DB 25)	RS-232C	SOURCE	FUNCTION
Pin 1	AA	739	No Connection
Pin 2	BA	739	Transmit Data: Used to transmit X-ON/X-OFF to the host. X-ON = DC1 = 21 octal = CTRL Q. X-OFF = DC3 = 23 octal = CTRL S.
Pin 3	BB	Data Set	Received Data: A −V is a Mark and a +V is a Space. When released, this line should be in the Mark condition.
Pin 6	CC	Data Set	Data Set Ready: A +V on this line allows the printer interface to accept data from the data set.
Pin 7	AB	739	Signal Ground
Pin 8	CF	Data Set	Data Carrier Detector: A +V on this line allows the printer interface to accept data from the data set.
Pin 11	SA	739	Reverse Channel: Used for transmitting printer status to the data set. It is normally in a Mark (−V) condition. When the buffer is full (1792 characters), this line goes to a Space condition (+V) until the printer is able to receive data again. Printer is factory preset to this condition.
Pin 20	CD	739	Data Terminal Ready: Used for indicating buffer status identical to reverse channel. This line is factory preset to be held at +V.

3.4 Serial Data Word Format (RS-232C)—The 739 Printer is factory preset to accept serial data of the format shown in Figure 3-4. Serial data is transmitted over the received data line (Pin 3) in a format consisting of one start bit, seven data bits, one parity bit, and one or two stop bits. The data bits are transmitted with the least significant bit (LSB) first. When no input data is being received the received data line is held in a mark (−V) condition.

Figure 3-4 Logic Diagram, Serial Word Format

3.5 Baud Rate, Byte Format, Printer Status Select Refer to Figures 3-5 and 3-6. The selectable switches are shown in the factory-preset positions for 9600 baud; even parity; 7 data bits; printer status on reverse channel only; and reverse channel normal polarity.

WARNING

Turn Power switch OFF and remove power cord from power outlet before removing rear cover.

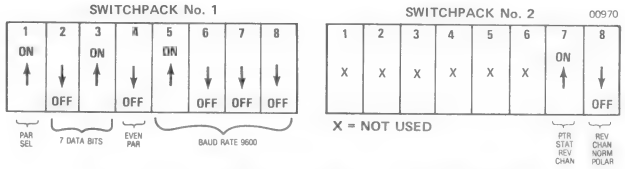


Figure 3-5 Factory Preset Conditions

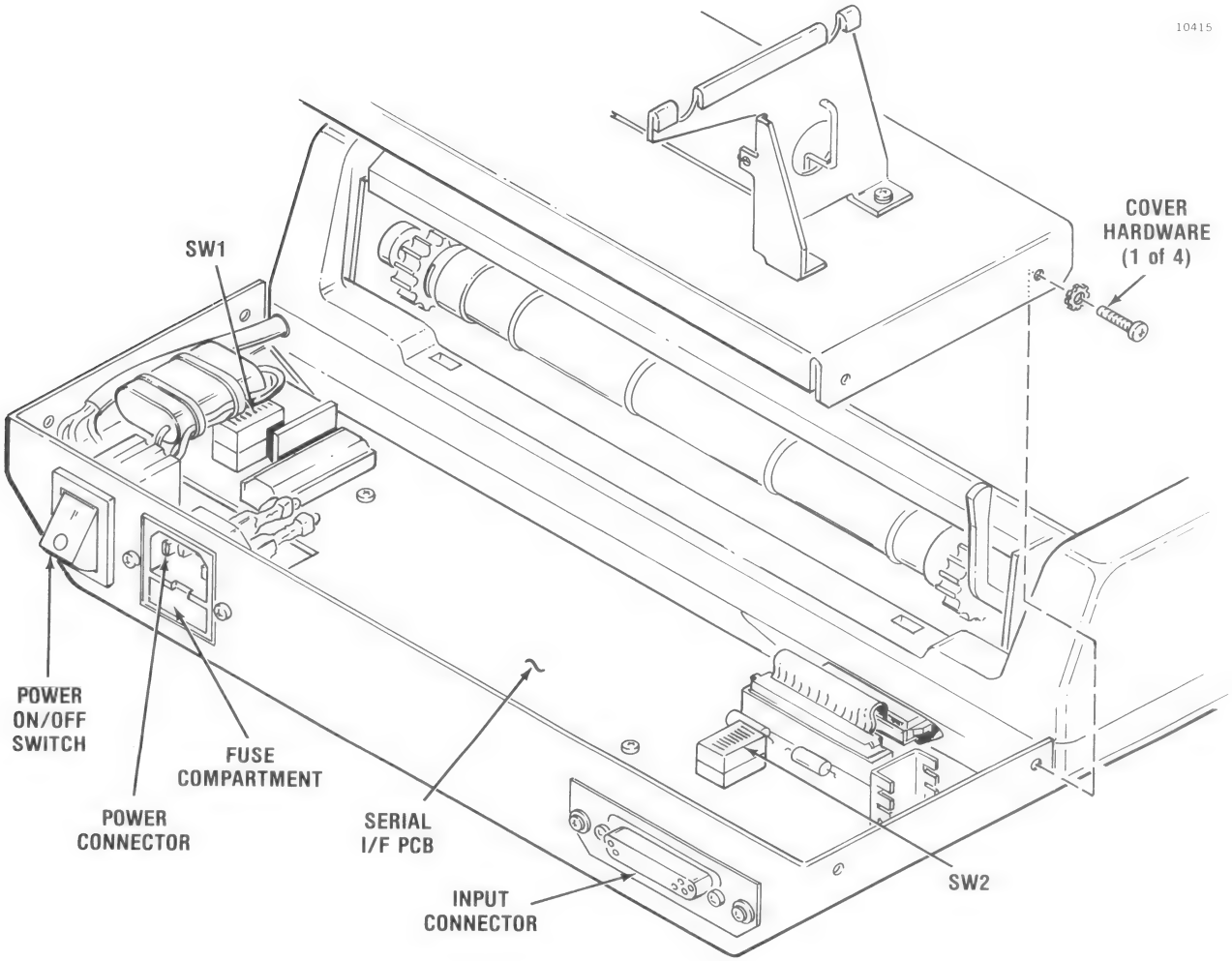


Figure 3-6 Locations of Switchpacks 1 and 2

Baud Rate Selection Range—Table 3-3 shows the switch-pack #1 (SW1) settings for baud rates from 50 baud to 19,200 baud. Refer to Figure 3-6 for the location of SW1.

Table 3-3 Baud Rate

BAUD	SW1 SWITCH SETTINGS 5	6	7	8
50	ON	ON	ON	ON
75	OFF	ON	ON	ON
110	ON	OFF	ON	ON
134.5	OFF	OFF	ON	ON
150	ON	ON	OFF	ON
300	OFF	ON	OFF	ON
600	ON	OFF	OFF	ON
1200	OFF	OFF	OFF	ON
1800	ON	ON	ON	OFF
2000	OFF	ON	ON	OFF
2400	ON	OFF	ON	OFF
3600	OFF	OFF	ON	OFF
4800	ON	ON	OFF	OFF
7200	OFF	ON	OFF	OFF
9600	ON	OFF	OFF	OFF
19200	OFF	OFF	OFF	OFF

NOTE

Dip Switch is preset at factory for 9600 baud operation. The power must be recycled if any of the switches are changed while the printer is ON.

Data Bits Selection (7 or 8 Bits)—Figure 3-5 shows SW1 (switches 2 and 3) factory set for 7 data bits. If 8 data bits are desired for the serial byte format, switches 2 and 3 should be both OFF.

Parity Selection (On or Off; Even or Odd)—Figure 3-5 shows SW1 (switches 1 and 4) factory set for Parity On; Even Parity. For selection of Odd Parity, or Parity OFF, switches 1 and 4 should be changed per the table below.

NOTE

A parity error causes a printout of the character @ (octal 100).

SW1 SWITCH SETTINGS

- PARITY ON—Switch 1 ON
- PARITY OFF—Switch 1 OFF

- ODD PARITY—Switch 4 ON
- EVEN PARITY—Switch 4 OFF

Printer Status Selection—Figure 3-5 shows switch-pack #2 (SW2, switches 7 and 8) in the factory-set positions to provide Printer Status on Reverse Channel only, Reverse Channel Normal Polarity. Figure 3-6 shows the location of SW2. To select other printer status and polarity, refer to the table below.

SW2 SWITCH SETTINGS

- PRINTER STATUS REV CHAN ONLY—Switch 7 ON
- PRINTER STATUS REV CHAN AND DTR—Switch 7 OFF

- REVERSE CHAN REVERSE POLARITY—Switch 8 ON
- REVERSE CHAN NORMAL POLARITY—Switch 8 OFF

4 OPERATION

4.1 Operator Controls, 739-3B—The operator controls for the 739-3B are identical to the 739-1 printer. Refer to the 739-1/739-2 Operators Manual (37400911). Paper loading instructions for the 739-3B are contained in this section. Figure 4-1 illustrates the rear view of the 739-3B.

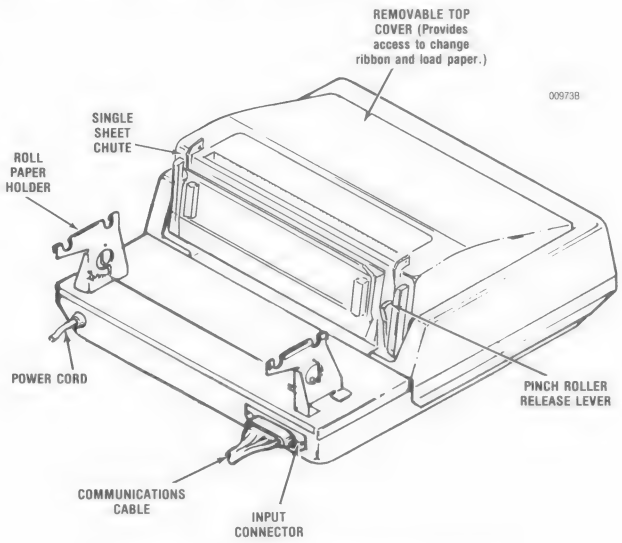


Figure 4-1 Rear View of 739-3B

4.2 Operator Controls; 739-2L, 739-4B, 739-4BL
These models are configured for VDE compliance. Refer to Figures 4-2 and 4-3 for the locations of the operator controls on these printers. The functions of the front panel controls are identical to those described in the 739-1/739-2 Operators Manual (37400911).

4.3 Paper Loading Instructions—Loading of single-sheet and fan-fold paper is described in the 739-1/739-2 Operators Manual. However, if fan-fold paper is used with extended base printers (739-2L, 739-3B, 739-4B, 739-4BL), the stanchions should be removed to provide direct feed into the rollers.

Roll Paper—Roll paper up to 8½" (216 mm) wide may be loaded onto the roller hub as shown in Figure 4-4. Note that single-ply roll paper is loaded so that it feeds over the top of the roll, then under the dancer bar, and two-ply roll paper feeds under the bottom of the roll, then under the dancer bar. This orientation is illustrated in Figure 4-5. After the roll is positioned on the stanchions, the loading procedure described in the 739-1/739-2 Operators Manual should be followed.

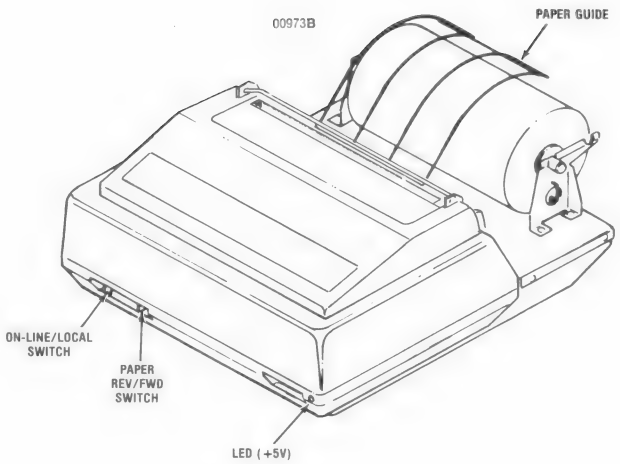


Figure 4-2 Front Panel Controls; 739-2L, 739-4B, 739-4BL

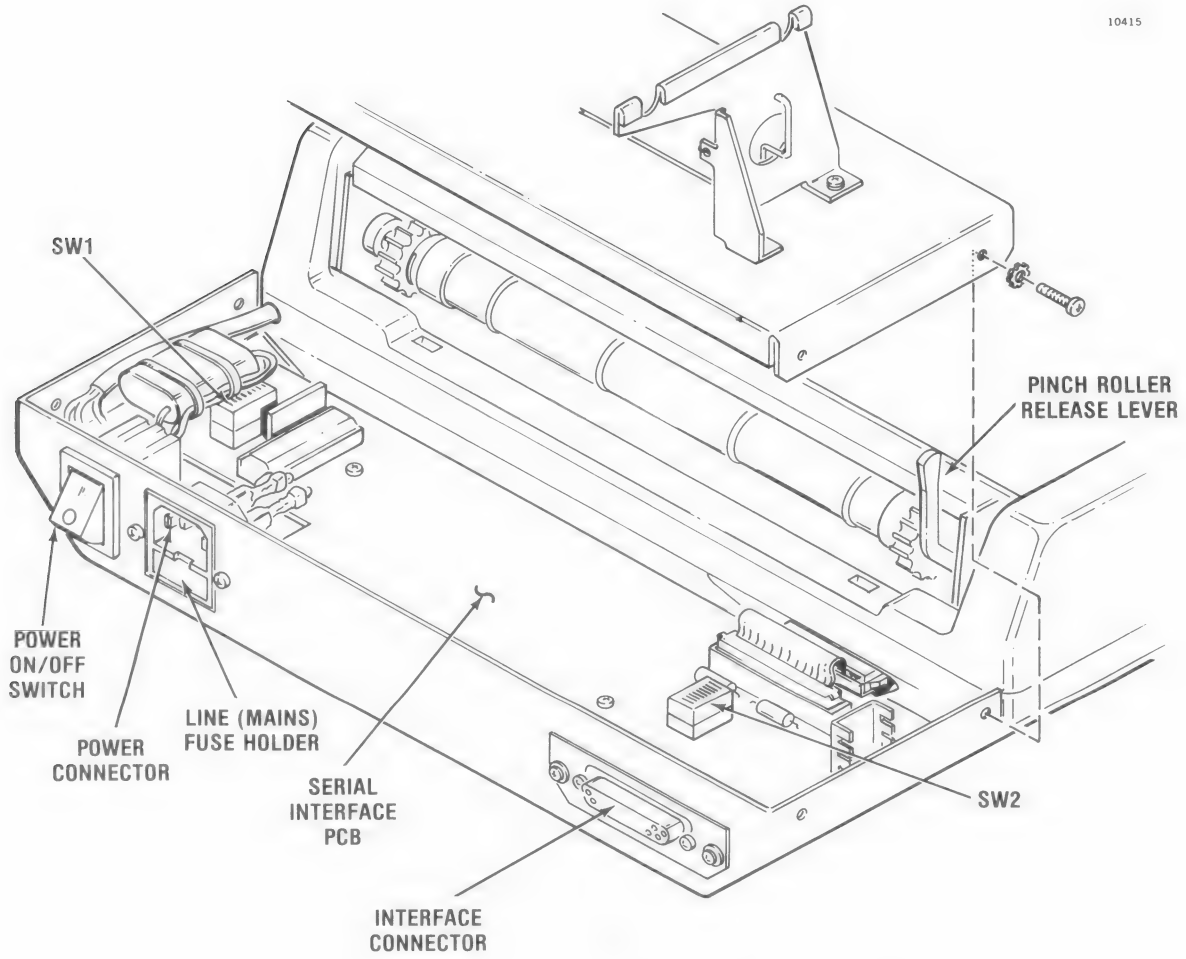


Figure 4-3 Rear Controls; 739-2L, 739-4B, 739-4BL

Roll Paper Loading—

1. Place front panel switch in the LOCAL position.

2. Load paper roll onto axle holder as shown in Figure 4-4.

3. Place paper roll and holder on the rear-most groove in the stanchions as shown in Figure 4-5. Position the shouldered end of the axle on the left stanchion.

4. Remove the top cover by lifting up at the rear.

5. Refer to 739-1/739-2 Operators Manual, paragraph 2.3 PAPER INSTALLATION. Move the roll to the forward stanchion grooves after loading is completed.

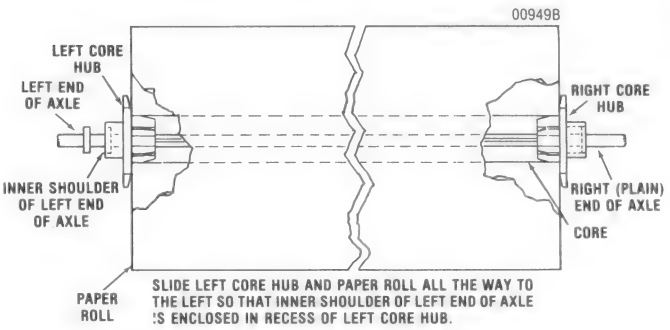
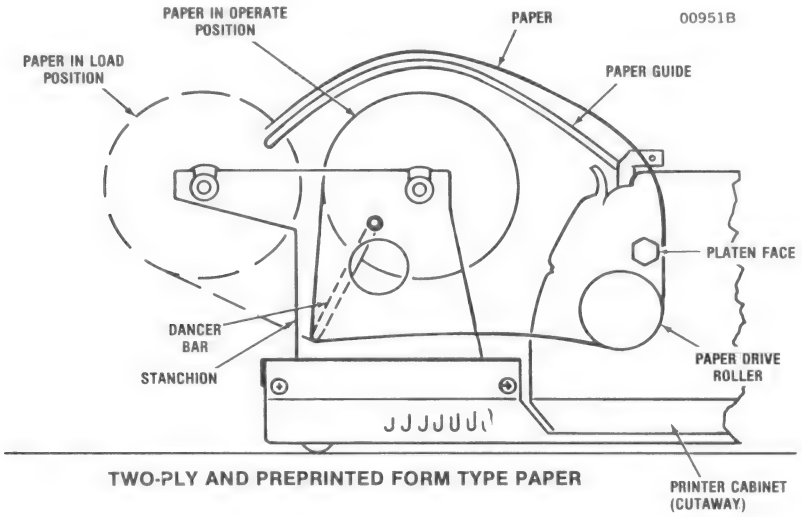

00949B
LEFT CORE HUB
LEFT END OF AXLE
INNER SHOULDER OF LEFT END OF AXLE
PAPER ROLL
RIGHT CORE HUB
RIGHT (PLAIN) END OF AXLE
CORE
SLIDE LEFT CORE HUB AND PAPER ROLL ALL THE WAY TO THE LEFT SO THAT INNER SHOULDER OF LEFT END OF AXLE IS ENCLOSED IN RECESS OF LEFT CORE HUB.

Figure 4-4 Placing Roll Paper on Axle



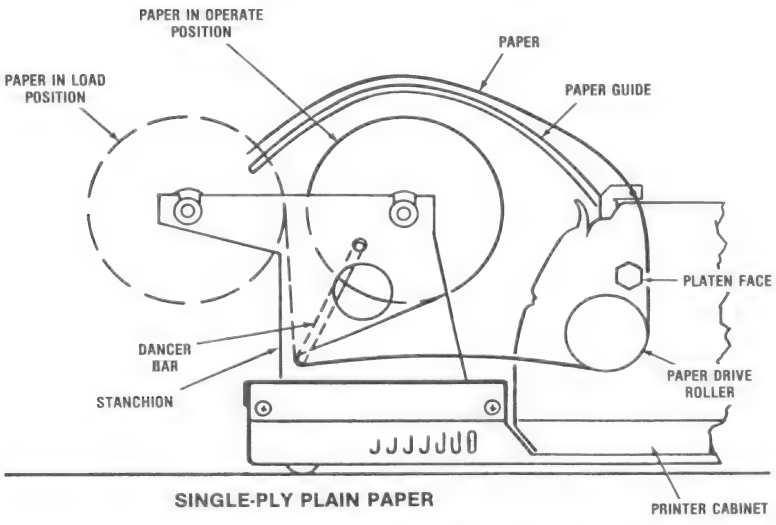


Figure 4-5 Roll Paper Loading

5 PRINCIPLES OF OPERATION

5.1 Data Communication (Figure 5-1)—The printer receives (ASCII Serial Data from the Data Set through the Interface Cable. The rate of data transmission is determined by the baud (bits per second) rate. The printer's Serial PCB contains baud rate selection switches which are set to agree with the rate of transmission from the host. Data Terminal Ready informs the Data Set that the printer is prepared to receive the data. Data Carrier Detector and Data Set Ready are sent to the interface logic before the Serial Data to guarantee that data sent is valid. The Serial PCB converts the high-level Serial Data to TTL levels which are more suitable to the printer logic circuits. The Serial Data is converted to parallel ASCII codes and stored in RAM (Random Access Memory) until the Logic Board is prepared to receive data. Reverse Channel signals the Data Set that the Input Buffer is temporarily full (1792 codes). Also, Transmit Data sends DC3 (X-OFF) at buffer full (1792 codes) and DC1 (X-ON) when there are 256 codes in the buffer. The main Logic Board requests data by enabling the Demand line. The 8-Bit Data (parallel) is transferred to the logic board by $\overline{\text{Data Strobe}}$. The data is decoded and printable characters are stored in a print buffer (Memory). When a CR (Carriage Return) or other line-ending code is received, the line is printed. Also, if the print buffer becomes full, the line is automatically printed. Buffer full for the printer is 80 characters (10 cpi), 132 characters (16.7 cpi), or 1186 dot positions (proportional). The Demand line is disabled while printing is being preformed.

5.2 Principles of Printing & Line Feed (Figure 5-1) The print mechanism rides on a carriage driven by a DC motor. The printing is performed in the forward direction only, printing up to nine dots per column. The paper feed (line feed) rollers are driven by a stepping motor which is capable of forward and reverse line feed; manual and computer-controlled. The ribbon drive (AC motor) moves ribbon past the print head at all times except when the carriage actuates the sensor at the leftmost carriage position. The power supply provides +5V regulated for the logic, +12V regulated for motor drive, +17V for solenoid and motor drive, and 24 VAC for the ribbon motor. Also, +5V and +17V are supplied to the serial PCB.

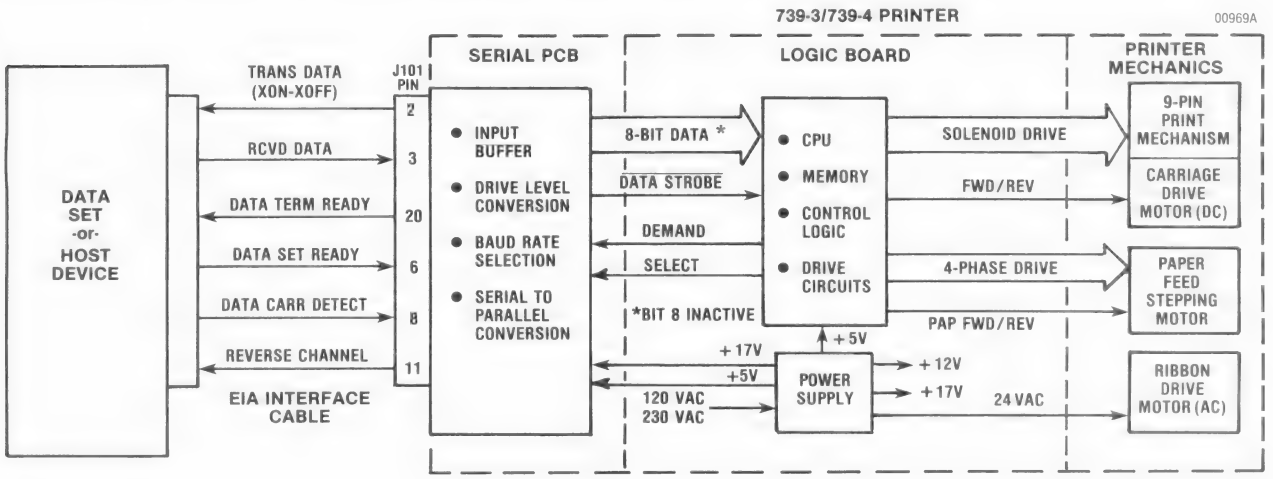


Figure 5-1 739-3/739-4 Block Diagram

PUBLICATION CHANGE PAGES

PCP NO. 37400911 /A.B CLERICAL CHANGE ■ DESIGN CHANGE □ DATE May 18, 1981

PUBLICATION AFFECTED	REV	PCP SEQ. NO.	ASSEMBLY AFFECTED NUMBER	OLD REV.	NEW REV.	ECO
739-1/739-2 Operators Manual						

These pages supplement information provided by the following Equipment Change Bulletins.

These PCP sheets reflect changes to the equipment that have not yet been documented in the technical publications or are simply clerical corrections to the specific pages in the manual. For documentation on your unit, always replace/delete/add the pages as noted below and verify the changes are applicable to your particular printer.

PUBLICATION ACTIONS

REPLACEMENT PAGES		DELETE PAGES		ADD PAGES	

COMMENTS

MODEL 739 GRAPHIC ALIGNMENT SPECIFICATION

PURPOSE—The purpose of this addendum is to clarify the alignment specification for columns printed during graphic operation. Due to circumstances related to timing, a shift in the line position from time to time may result in as much as .014" (.36 mm) offset. This shift is not noticeable in most graphics except for those with vertical columns. The shift may not occur at all in some graphic samples, whereas a repeat printing of the same graphic may contain the shift. If this occurs, service is not indicated unless the shift is greater than one dot width. Paragraph 1.6 in the Operators Manual shows graphics typical of the quality produced by the 739 graphics function.

NOTE:
Some users may have printers which are accurately documented by the contents of the current manual prior to this PCP.
These users should retain the pages noted with an asterisk (*) and add these pages as a supplement for future reference.

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051
Telephone (603) 883 - 0111

READERS COMMENTS

Publications Title Model 739 Series Printers Operators Manual

Publications No. 37400911-9001 Revision B Date June 1981

List PCP's, if any, received with manual: _____

Name _____ Company _____

Address _____ City _____ State _____ Zip _____

The intent of this manual is to provide accurate and meaningful information to help you properly operate and efficiently maintain equipment manufactured by Centronics Data Computer Corp. To this end, we welcome your comments regarding any errors, discrepancies or omissions you may have discovered, or any suggestions for improving the overall manual. This postage-paid form is provided for your convenience. Your comments will be appreciated and should be a useful input at the next revision of this manual.

TECHNICAL OR CLERICAL ERRORS:

(Specify Page Numbers)

SUGGESTIONS FOR IMPROVEMENT:

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051
Telephone (603) 883 - 0111

Fold

BUSINESS REPLY MAIL
No Postage Necessary if Mailed in USA

First Class
Permit 31
Hudson, N.H.
03051

Postage will be paid by—

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051

ATTN: MGR. TECHNICAL PUBLICATIONS

Fold

PUBLICATION CHANGE PAGES

PCP NO. 37400911/B.A ☐ CLERICAL CHANGE ☐ DESIGN CHANGE DATE 7DEC 1981

PUBLICATION AFFECTED	REV	PCP SEQ. NO.	ASSEMBLY AFFECTED			
			NUMBER	OLD REV.	NEW REV.	ECO
739 Operators Manual	B					
These pages supplement information provided by the following Equipment Change Bulletins.						

These PCP sheets reflect changes to the equipment that have not yet been documented in the technical publications or are simply clerical corrections to the specific pages in the manual. For documentation on your unit, always replace/delete/add the pages as noted below and verify the changes are applicable to your particular printer.

PUBLICATION ACTIONS

REPLACEMENT PAGES		DELETE PAGES		ADD PAGES	

COMMENTS

MODEL 739-1 INTERFACE CABLE
P/N 63669343-4002

The Interface Cable (Figure 1) allows the 739-1 to be connected to many popular computers. Bit 8 is grounded within the cable. The cable is 12" long(31.5 cm), and has a 40-pin connector (P/N 31230032-1001) at the printer end and a Female DB25 (25 pin) connector at the host end.

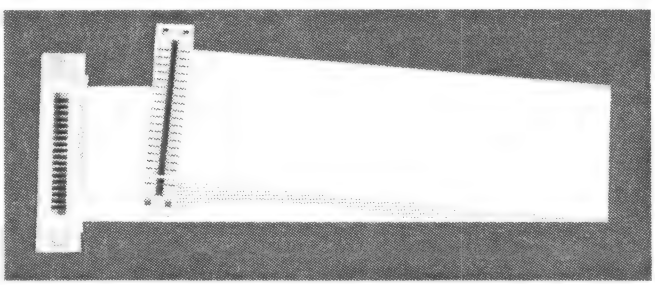


Figure 1 Interface Cable (P/N 63669343-4002)

NOTE:
Some users may have printers which are accurately documented by the contents of the current manual prior to this PCP.
These users should retain the pages noted with an asterisk (*) and add these pages as a supplement for future reference.

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051
Telephone (603) 883 - 0111

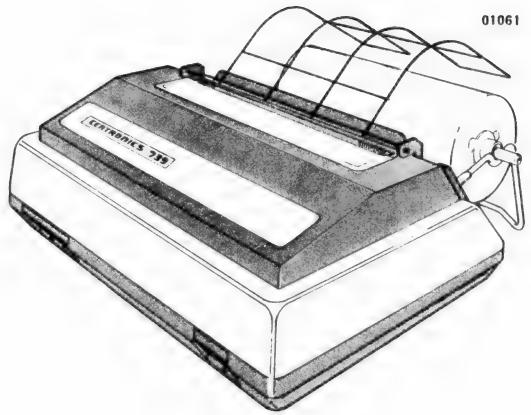
NOVEMBER 1981
P/N 37408087 REV B

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051
Telephone (603) 883-0111

UNPACKING/REPACKING INSTRUCTIONS

FOR

739 PRINTERS



NOTE

FAILURE TO ADHERE TO THE FOLLOWING INSTRUCTIONS COULD RESULT IN VOIDING THE WARRANTY.

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051
Telephone (603) 883-0111

UNPACKING/REPACKING INSTRUCTIONS

NOTE: FAILURE TO ADHERE TO THE FOLLOWING INSTRUCTIONS COULD RESULT IN VOIDING THE WARRANTY.

RECOMMENDED TOOLS

Knife

UNPACKING (See Figure 1)

1. Carefully cut tape on shipping carton (4) so top flaps can be opened.
2. Remove envelope containing manual (3) and interface cable (12) (739-1 only).
3. Remove contents of carton (4) and place on work surface.
4. Remove taped paper roll holder (2).
5. Remove both end caps (1 and 6) from the printer (9), removing paper roll hub (11).
6. Remove paper bail (7) from top of printer (9).
7. Cut tape (10) on plastic bag (8).
8. Remove printer (9) from bag (8).
9. Remove printer top cover.
10. Remove left restraint (13).
11. Move printhead (14) to left.
12. Remove right restraint (15).
13. Replace printer top cover and remove warning sticker.

REPACKING

Reverse steps 1 through 13. Seal carton with tape.

REFER TO OPERATORS MANUAL FOR SET-UP PROCEDURES FOR YOUR PRINTER.

MATERIALS LIST

1. Left End Cap
2. Paper Roll Holder
3. Operators Manual
4. Shipping Carton
5. Packing List
6. Right End Cap
7. Paper Bail
8. Plastic Bag
9. Printer
10. Shipping Tape
11. Paper Roll Hub
12. Interface cable (739-1 only).
13. Left (Head) Restraint
14. Printhead
15. Right (Head) Restraint

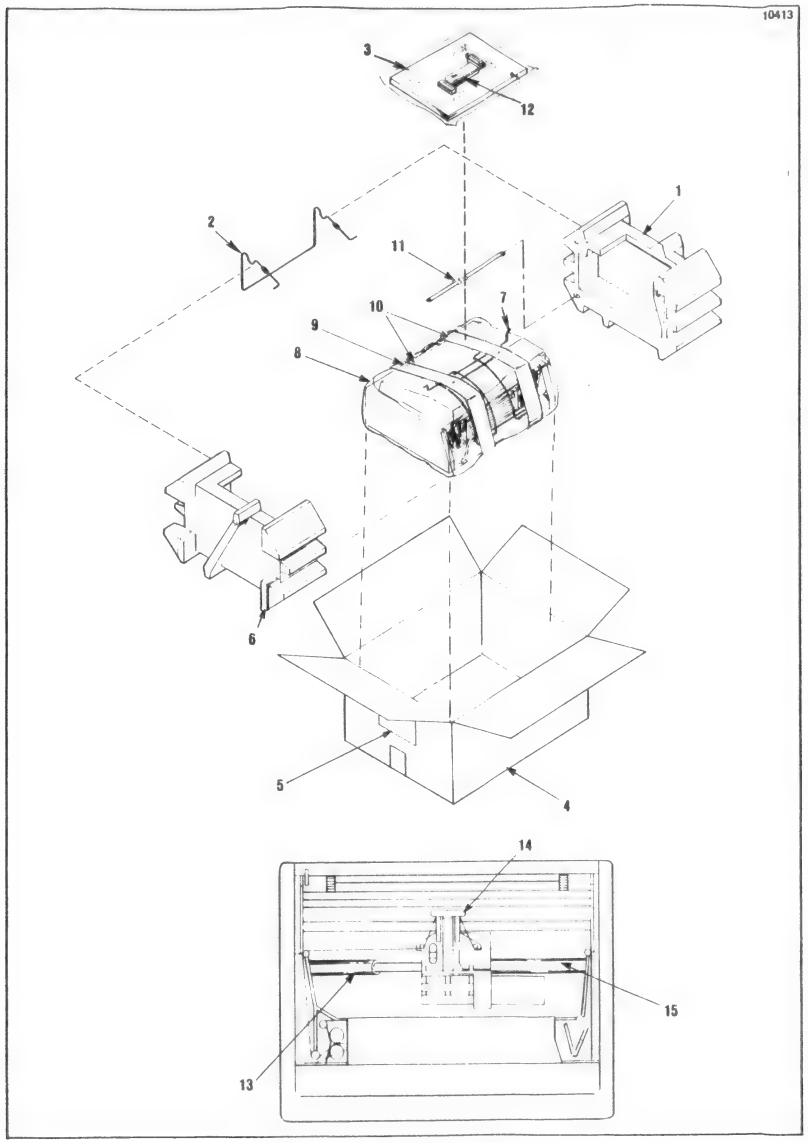


Figure 1. UNPACKING THE PRINTER

CENTRONICS®
data computer corporation
Hudson, New Hampshire 03051
Telephone (603) 883 - 0111

THE CENTRONICS MODEL 739

THE FOLLOWING TEXT IS IN 10 CPI MONOSPACE (100 CPS):
The Centronics Model 739 is a proportional spacing, right justification, high density dot matrix printer with pin-addressable graphics.

The Centronics Model 739 is a proportional spacing right justification, high density dot matrix printer with pin-addressable graphics.

PROPORTIONAL SPACING:
With this feature the Model 739 automatically compensates for character size differences by adjusting the horizontal width of letters.

RIGHT JUSTIFICATION:
This feature allows the Model 739 under host control to print lines of copy that are right justified. An important capability for word processors in text preparation areas.

HIGH DENSITY DOT MATRIX:
The Centronics Nx9 free-flight print head creates characters within a standard matrix size packed with 18 possible horizontal dot placements rather than the standard nine dots. Twice as many dots mean the printed characters are more dense and legible.

THE FOLLOWING TEXT IS PROPORTIONAL SPACED AND RIGHT JUSTIFIED:
Centronics is the world's leading independent manufacturer of computer printers ranging from families of serial dot matrix impact printers and fully formed character band line printers to nonimpact microprinters.

BI-DIRECTIONAL PAPER MOTION:
Paper motion in the forward and reverse directions allows the use of superscript and subscript.

IN ANY WATER SOLUTION $(H_3O^+)+(OH^-)$ ALWAYS EQUALS 10^{-14}.

CONTROL CODES:
LINE FEED AND REVERSE LINE FEED DO NOT TERMINATE THE LINE.
THE FOLLOWING A,B,C,D MUST BE IN CHARACTER LOCATIONS 1,2,3,4 AND ON SEPARATE LINES.

```
A   A   A   A
 B   B   B   B
  C   C   C   C
   D   D   D   D
```

RIGHT JUSTIFICATION:
NEXT LINE = H,ESC,1,H,ESC,2,H,ESC,3,H,ESC,4,H,ESC,5,H,ESC,6,H.

HHHHHHH

THE DISTANCE BETWEEN THE H'S MUST INCREASE BY .0066". THE DISTANCE BETWEEN THE FIRST AND LAST 2 H'S MUST BE .0466".

AUTO LINE FEED ON CARRIAGE RETURN IS AN OPTION.

UNDERLINE MAY BE TURNED ON BY SI AND OFF BY SO.

EXPANDED MAY BE TURNED ON BY AN ESC,SO AND OFF BY AN ESC,SI OR AN END OF LINE

CHARACTER SETS:

PROPORTIONAL NORMAL
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

PROPORTIONAL ELONGATED
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

10 CPI NORMAL
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

10 CPI ELONGATED
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

16.7 CPI NORMAL
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

16.7 CPI ELONGATED
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~

05460 — SERIAL #

INSPECTOR

QC STAMP

FOR INFORMATION REGARDING SERVICE ON YOUR PRINTER CALL FIELD SERVICE ENGINEERING (603) 883-2492.

CENTRONICS DATA COMPUTER CORP.

ONE WALL STREET, HUDSON N.H. 03051
TEL.(603) 883-0111, TWX.(710) 228-6565, TLX. 94-3404

END